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THE PRACTICAL TEACHER

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EDUCATION IN PARLIAMENT—END OF THE SESSION.

ALWAYS something of a farce, an education debate in the House of Lords. Anglican peers and Roman Catholic peers are there in abundance, but Presbyterian peers are vastly fewer, and Nonconformist peers are hardly there at all. Bishops and archbishops variegate the red benches with gowns of black silk and lawn sleeves white as the driven snow, but no Baptist nor Congregational minister of religion sits confronting them. Government peers are counted by hundreds. Opposition peers are forty—"the Forty Thieves" as humour dubs them—at the most. Into such an assembly on 29th July the Education Bill for London was flung.

It had come up from the House of Commons, where its third reading took place under circumstances of almost somnolent calm. The French members of Parliament were at Westminster that day, and the Terrace was crowded to see and welcome them. Some of them went into the Strangers' Gallery and watched: they could not listen understandingly, because so few of them had a word of English at command. If they could have known it, the debate was about a Bill of moment—a measure which will make London a more formidable outrunner of Paris than ever. But what the Frenchmen noted, and what they said, was, "How calm, how calm!"

The House of Commons was almost empty when Dr. Macnamara moved the rejection of the Bill; the House did not thicken in appearance when Mr. Bryce pounded the Bill logically, nor when Sir William Anson defended it academically; the House was reduced almost to inanity before the division bell called a big majority to give the final hoist in the House of Commons to the Bill. There ought to have been a procession to carry the *projet de loi*, as the French called it, down the sounding, painted corridors to the House of Lords—a technological student gripping the piece of blue paper at one end and a voluntary school scholar at the other. As a matter of fact, it was carried from one House to the other by a clerk in a mushroom-wig.

In the House of Lords the Marquis of Londonderry took the bantling by the hand. He confessed that it was not the Bill of which he had been the father: it had been changed at nurse. *His* Bill included "every consideration possible to the importance of the metropolitan boroughs." This did not. Nevertheless, etc. In short, "It's a new Bill under an old name; but give it your Lordships' approval." Whereupon there was that discreet and well-bred, half-inaudible murmur which passes muster for cheers in the House of Lords.

But there is no doubt about the debating power of the peers when they set about it. In the great fiscal question this session already they had shown their capacity to criticise and discuss, and a debate of high level took place about the Marquis's bantling. Lord Reay asked the peers to turn it out of doors forthwith, with no more acceptance than the House had given to a certain organ-grinding claimant to the title of Hinton. The Archbishop of Canterbury, weighty Scot, defended the Bill in a long oration. Lord Tweedmouth said that the education proposals of the Government amounted to a new endowment of the Church of England, and involved an outrage on the consciences of the teachers. The Bishop of London wished only to "deal with the morality of the Bill." If it could be proved that this was an immoral Bill he would not support it, he said, proudly gazing around him in conscious rectitude. Lord Sandhurst dwelt on the excellent past of the London School Board.

Then up rose the Bishop of Hereford, a prelate of as pale and saintly an appearance as was Pope Leo the Thirteenth himself. The Act of 1902, he believed, contravened the fundamental principle of civic justice, and the application of this Bill to London would injure the

interests of the Church of England, he felt sure. He said he should be amazed if the National Union of Teachers (that Charles's head of these debates) did not protest against the exclusion of half its members from the best posts in the service. The Bishop of Rochester, rising from beside his right reverend brother in God, took quite the opposite opinion. Silver-tongued Lord Coleridge gave the contrary again. Earl Spencer, the red bearded—the white-bearded now, alas!—summed up for the Opposition; and the Duke of Devonshire used his heavy lip to sum up for the Government. Then came the farce, after all this stately drama—the division, the solemn march through panelled corridors, past peers who waggle ivory batons at the passers, and count them on their fingers, so to speak. Result—Contents, 63; Non-Contents, 26; majority for the Second Reading, 43. The Lord-Chancellor thereupon folded his robe like the Arabs, and silently stole away.

When the Bill went into Committee some seventy peers assembled to do it grace. One point of amendment, and one point only, was gained. The Marquis of Londonderry kept a promise made by Mr. Walter Long, when in the report stage in the House of Commons. Mr. Yoxall moved that the minutes of the proceedings of the London Education Committee should be open to inspection by any London ratepayer. On the promise of Mr. Long that this should be inserted in the Bill in the House of Lords if the law did not already provide for it, Mr. Yoxall withdrew his amendment, with the result that it was embodied in the Bill in the House of Lords. This completed the list of instances, seen in this Bill, as in the Act of 1902, of the singular and marked influence which the ex-teachers in the House have exerted during these debates. It is not inaccurate to say that the points they have pressed and argued for have almost all been gained, and the points other critics of the Bills pressed and argued for have almost all been lost.

Dr. Macnamara failed, it is true, in obtaining the special election of additional London County Councillors for education work, but so did the Bishop of Hereford in the House of Lords. Mr. Yoxall, also, failed to get three-fourths of the Borough Education Committees appointed by the County Council, instead of one-fourth only; but so did the Bishop of Rochester when he moved a similar amendment in the House of Lords. Nevertheless the Bill, after its long chastening, has been greatly changed for the better; and with regard to this Bill, as last year with regard to the Act of 1902, teachers and other expert educationists may congratulate themselves on what has been done.

Looking back upon the past session, the history of Education in Parliament has been less portentous, perhaps, than was the case of the prolonged session of 1902. The year 1902 was the calendar turning-point in the affairs of English education, and 1903 has only been the pivot for London education. Scottish education has remained untouched. Irish education has gained something. After a long debate, in which Mr. Yoxall was the only non-Irish M.P. who joined, the Irish Secretary promised to do something for bettering the staffs and warming the premises in Irish schools.

Amidst much "sound and fury signifying nothing" about denominationalism and the sacred rights of parents to educate their children in theological formulæ at the public expense, a great measure of change in the local administration of London schools has gone forward; and this, for a metropolis so vast and important as London, cannot be considered a trivial thing. The years 1902 and 1903 have seen the most important laws on English education that have taken place since 1870. Henceforward every child in every public elementary school in England and Wales will have every penny of the actual cost of his education paid for him by the public purse, except for such sums as here and there a school collects from the children in weekly fees. There are, of course, loose ends to be caught up and tied in this web of new legislation which Parliament has been weaving, and prominent as such is the question of "children over fifteen" in the public elementary schools. The Marquis of Londonderry promised, in the House of Lords before the session ended, a Bill next year to deal with this last remnant of the mad mischief which the Cockerton cabal wreaked at first upon Board Schools. It is less than three years since that, in this magazine, the ultimate defeat of the Cockertonisers was predicted; and to-day the prediction has come true. They shot their bolts against popular and efficient education, and the chief result has been that legislation has now enabled English education to become more popular and efficient than ever before. Thus does the whirligig of time bring round its revenges; thus, when troubles are faced with skill and hope, do troubles melt into benefits.

BY MANY HANDS.

"Quot homines, tot sententiæ."

A Holiday Task.

IT is quite natural that at this time of the year a holiday flavour should creep into these notes. Further excuse is unnecessary. Seeing that teachers are scattered to the four winds of heaven and in all sorts of out-of-the-way nooks, we can't help thinking what a curious and interesting body of information would be collected were they to study, even in a *dilettante* way, the customs and dialects of the parts they find themselves located in. Some would, perhaps, feel inclined to dismiss the affair in the language of the explorer who reported on the manners and customs of the region he had explored in the following laconic fashion: "Manners—none; customs—beastly." But many holiday-makers would find an added zest in their annual relaxation were they to turn the place of their summer sojourn into a field of gentle observation. After all, as a subject of interest, there is nothing to beat one's fellow-man. The human biped in this respect stands easily first.

For Devonians—

HERE, in a "back of beyond" corner of Devon, quaint words crop up which, as the French say, "give furiously to think." An uncanny or fearsome thing is called "wisht" (please understand that spelling is phonetic), a word that recalls North-country terms; and a ghost to these Devonians is a "wishness." Now, where in

BRITISH MUSEUM

the name of all things philological does "wishness" come from? A game of skittles played in a rather peculiar fashion in a sort of trough is called "keels." This can be no other than the French skittle-game of "quilles," pronounced in the Devonian style. But where does the French influence come from in this forgotten corner of the south coast? Among the fishermen a bed of shingle on which weed has taken root is called a "grāvet"—a most peculiar term, which, as far as we know, is purely local. Yet here again in some mysterious way French influence comes in, for shingle beaches are called in French "gravats." But in what way did the influence of French make itself felt in the wild coast line between The Start and Bolt Tail? Perhaps Devonians can help.

THE way in which these Devonians stick to the "th" as the third personal ending of the present tense of the verb gives a quaintly archaic flavour to their speech, apart from the odd names they give to objects. Why should they call a hay-fork a "pike"? It doesn't recall one, and the name they use doesn't suggest the function of the article any more than the Devonian "eevil" suggests the potato-fork which it denotes. But here we are falling into the error of the sailor who remarked, on returning from a first cruise to France, "Over there they call a cabbage a *shoe;* why can't they call it a cabbage when they know it is one?"—in saying which he fell into a notoriously common fallacy, and we are in danger of imitating him. Still, the odd terms and usages employed in speech are a constantly diverting study, to say nothing of the light frequently thrown on language development and influences by one's treasure-trove. For instance, Auvergne is one of the least known and most highly isolated districts of France. To our utter astonishment an old peasant of Royat, in a salutation, used terms in their original sense which have fallen from that meaning for some two centuries or more. And Auvergne used to be connected with one of the Spanish kingdoms, though in the centre of France. One evening, as a famous Parisian professor of literature, himself an Auvergnat, passed, a peasant made a remark to his wife in *patois*, which, word for word, allowing a little for strange terminations, was good Spanish. But the subject is endless.

And Others.

A GREAT deal of fuss is being made in the dailies over the degeneration of the national physique, and all sorts of people, expert and inexpert, are airing their opinions thereon. Here is a field where the teacher has an opportunity that is unique. They are familiar with the individuals who make up the nation, from early childhood up to youth, and are better qualified to speak on the question than the majority of those who are writing letters to the public, or calling for inquiry into the subject. But they must necessarily proceed scientifically, and submit their scholars to a searching set of tests. Instead of much of the futile pseudo-scientific work that goes by the name of child-study, a work of real usefulness lies here to hand, and one that calls for only a spirit of patient and accurate observation. Questions of weight and measurement at various ages, of growth, of the influence of environment—that is, conditions of life and food, differences between the town and country child in these respects—are surely within the competence of every teacher who possesses the necessary patience, and the results obtained would go farther to settle the question of the decay or improvement of the national physique up to the age of fifteen than any amount of inspired letters to the papers. And if the teachers in secondary schools were to take up the work where the elementary teachers left off, a unique body of trustworthy information would be the result.

The Teacher as Investigator.

A LIST published recently by the *Daily Chronicle* seems to us almost positively harmful in principle. It has been customary for the *Daily Chronicle* to publish annually a record of scholarships gained from our public schools, giving the number of boys in the school, the number of scholarships gained during the year, and in this last list a total of scholarships gained by the individual schools during seventeen years. The list is arranged numerically, in a sort of "order of merit." We say we consider such a tabulation almost harmful, for the inference is sure to be drawn that the schools from which the largest number of scholarships have been gained are the *best* schools. We are quite aware that such an inference is by no means the intention of the compilers, but in this case it is merely a question of human nature, not of compilers' intentions. In the matter of examinations we are fast approaching the Chinese standpoint: they confront the beginner in everything, and everywhere. But this sort of glorification of examination results appears to us quite unnecessary.

A Scholarship List—

THE process of training boys or girls to take scholarships is quite a special one, and as such, is no criterion of the badness or excellence of the education given in the rest of the school. A school which is rich, and has money to spend in attracting promising pupils by entrance-scholarships, might stand at the top of the *Daily Chronicle's* list, and be looked upon by the uninitiated—that is, by the majority of laymen—as the best school in the country, and yet the general education given might be far beneath that given by another school at the bottom of this list. We do not think that a very successful army coach gives the very best of educations because he is successful in passing his pupils into the army. We merely think that he gives the best training for taking a very special form of examination successfully; and it is quite within the bounds of possibility that this training is not at all a good one educationally. This seems to us to be the real criticism of the *Daily Chronicle's* list, and we can quite understand the position regarding it taken up by the headmasters of Haileybury and of Dulwich. Scholarship successes are by themselves no test of general efficiency; yet a list like the one we are criticising inevitably tends to foster such an opinion.

And a few Comments thereon.

N.U.T. NOTES.

NO more fruitful source of discord between teachers and school managers has existed for thirty years than that of compulsory extraneous tasks; and much rejoicing ensued, especially amongst the teachers in the non-provided schools, when it was found that Article 71* in this year's Code stipulated that not only must all their engagements be in writing, but that they must contain the following clause:—"The teacher shall not be required to perform or abstain from performing any duties outside the ordinary school hours, or unconnected

Extraneous Duties.

with the ordinary work of the school." The Board of Education further declare that they will not recognise any teacher in such schools where this condition is not complied with. This, of course, is all to the good; but possibly another forward step remains to be taken. This is for the Board of Education to penalise in some fashion those school managers who have so far ignored the spirit of Article 71* as to include any reference to extraneous tasks in their advertisements for teachers. The Executive of the Union have already done their share in drawing the attention of the directors of the organ of the Union to the publication of advertisements for teachers requiring the performance of unpaid extraneous tasks as a condition of appointment, and in all probability these will be excluded from the *Schoolmaster* for the future. A duty lies also with the teachers themselves. Unfortunately, it is still found that some weak members of the profession offer the performance of extraneous tasks as an inducement to their engagement. However difficult it may be to completely prevent this, common loyalty to their fellow-teachers and to the Union, which has striven so zealously and successfully on behalf of freedom, should be sufficient to make any teacher chary of committing what I feel compelled to describe as *an unprofessional act*. Two or three leading and influential local associations have already moved in this matter, and there are more unlikely things than a discussion on what constitutes true professionalism at the Portsmouth Conference.

* * *

Inspection v. Examination.

DURING the last few years of the *régime* of Sir George Kekewich, the individual examination of scholars in primary schools was entirely prohibited. This year, owing to the machinations of a few influential busybodies, the power to examine was restored to H.M.I.S. in Article 22 (*b*) of the Code, which runs as follows:—

> "The Inspector may, where he considers it desirable, hold a formal examination of any class in the school upon the work done by the class during the previous six months; *but not less than six months' notice will be given before such examination is held.*"

The provision that six months' notice must be given before such examination is held was mainly the result of a deputation from the Executive to Lord Londonderry and Sir William Anson, and my own opinion is that few, if any, formal examinations will be deemed necessary by H.M.I.'s. But a new danger has arisen. The officials usually known as "Board Inspectors" have, in certain towns, instituted individual examinations on their own account; and as a consequence, we have running concurrently in the schools the system of inspection by H.M.I.'s. and individual examination by Board Inspectors. Nothing could be conceivably worse than this state of affairs, for the two systems can no more mix or harmonise than oil and water can. London is, curiously enough, one of the places where the teachers are being vexed and perplexed, and, what is yet more strange, only a proportion of the Metropolitan Board Inspectors have found it necessary to use the bad old methods in assessing the work done in the schools. Surely if an official in District A can judge with comparative accuracy of the worth of the work done in the schools without individual examination, it should not be beyond the capacity of an official in District B to do likewise. As a rule, only certain subjects are taken by the examining inspectors, and these are not necessarily the most important, but those which easily lend themselves to mechanical tabulation. It is stated with some confidence that this examination is bound to retard the promotion of scholars, who will be kept for a full year in a standard whose subjects they possess adequate knowledge of. Over-pressure upon both teachers and scholars may possibly also ensue, whilst there is more than a probability that the pernicious system of "keeping in" the backward children will be resorted to, especially during the recreation period. Every one agrees that the marvellous mechanical accuracy of "4 sums right and 0·1 mistakes in dictation" of the eighties has not been maintained, but that infinitely greater and higher intelligence is displayed (both by teachers and taught) to-day than formerly will not be gainsaid. A cast-iron system of individual examination can have but one effect—the discouragement if not the destruction of the originality and individuality of even the most capable teachers.

* * *

Leaving Certificates.

THIS question of inspection *versus* examination has once more directed public attention to the subject of "Leaving Certificates;" and although many teachers are totally opposed to their introduction, yet it is possible that, with proper safeguards, and under fair conditions, they might not be altogether prejudicial. It is claimed that the parents of many of the children attending the primary schools would value a certificate showing that their sons and daughters had attained a certain standard of proficiency at the termination of their school career. It is stated also that some of the educational authorities which now hanker after an individual examination of scholars would be satisfied with such examination at the end of the school course. If, however, comparisons began to be made, as a result, between school and school—if percentages of passes began to be struck and published—then the Leaving Certificate would become an altogether "accursed thing." The conditions of the schools vary to such an extent that percentages of passes might afford no criterion of the work done in them. In connection with the general question, a well-known educational expert propounds the following interesting series of questions:—

1. Should an examination for Leaving Certificates be compulsory or optional?
2. If compulsory, should the compulsion rest on the school, or on the individual scholars?
3. Should the acquirement of a Certificate be a means, or the only means, of obtaining liberation from school?
4. If optional, should the option rest with the school, or with the scholars?
5. Should it be a means of leaving an elementary school, or the only possible means of obtaining admission to a school of a higher type?
6. Is a Leaving Certificate Examination compatible with the modern system of school inspection? If so, under what conditions?
7. If Leaving Certificates are instituted, should they be granted on an examination alone, or on an examination *plus* school record?
8. Who should conduct the examination?
9. Should the syllabus for examination grow out of the school curriculum, or should the examination influence the curriculum?
10. What means should be adopted to secure the standard of uniformity?
11. If the Certificate is to depend partly on schoo

records, what form should such records take? Would the Continental monthly exercise-book method be a useful and attractive addition to the English school course?

These, and possibly other interesting queries, will, in all probability, come up for discussion before the Education Committee of the Executive.

* * *

Mr. Councillor Peaker.

MR. FREDERICK PEAKER, as Chairman of the Finance, Press, and General Purposes Committee of the Executive, has the virtual direction of an important side of the Union's work; and the regularity and unanimity with which he is re-elected to the position, year after year, is strong testimony of the success with which he fills his responsible post. He has probably investigated more cases of dismissal of teachers than any fellow-member of the Executive, and in addition, has undertaken educational inquiries all over England and Wales, by special request. When attempts have been made, at our Easter Conferences, to confine membership of the Executive to teachers actually working in the schools, it has been pointed out, with effect and perfect truth, that Mr. Peaker's presence at Russell Square saves to the Union the emoluments of a principal official. Nine or ten years ago he relinquished his position in school at the request of the teachers of his native town, and successfully strove for a seat on the Leeds School Board. On that body he did invaluable work, and on the Board last elected served as Chairman of the School Attendance Committee. The impending "passing" of the School Board caused him, last November, to seek municipal honours. After a hard struggle, he was defeated. But his opportunity came, about a month ago, at a bye-election, when, by a majority of 490 votes, he triumphed over his antagonist. This result is particularly gratifying when one bears in mind the attempts made to keep Mr. Peaker off the Leeds Education Committee. In all probability, ere these lines appear, his experience and ability will have made themselves apparent where the necessity is greatest.

* * *

"B. and O." Council at Sydenham.

AN admirable custom has developed latterly of holding the last Council meeting before the recess at the Boys' Home at Sydenham, and this year the agreeable practice was continued. The business proper occupied less time than usual, even the most prolix of Council members seeming to realise the *outside* attractions of the magnificent orphanage. The "old boys" were, as usual, the guests of the House Committee, and a veritable delight it was to see how these lads and young men were prospering. Possibly some of them may have contrasted for a moment the spacious halls at Sydenham with their modest predecessors at Peckham, and almost wished themselves "our boys" again. I never visit either of our Homes without the feeling that should a teacher be called away, and circumstances unfortunately necessitate it, the guardians of his orphans might, with confidence and gratitude, entrust their future to the kind-hearted men and women who regulate affairs at Sydenham and Sheffield.

* * *

North London Election.

IN the closing days of July a bye-election of an unusually interesting nature occurred in the North London electoral district, owing to the resignation of Mr. T. H. Jones, appointed (it will be remembered) to an inspectorship under the London School Board. Finsbury put forth as its candidate Mr. T. A. Cartwright, B.A., B.Sc., who needs no commendation to the readers of the *Practical Teacher*. His great reputation was immensely strengthened at the Buxton Conference, and he would undoubtedly have been an acquisition to what Dr. Parrott, in a merry moment, described as "the concentrated wisdom of the Union." His opponent was Mr. John Kelly, a gentleman who received the nominations of Chelsea, London West Suburban, Marylebone, Ealing, and St. Pancras Associations, and whose chance of success was rosy from the outset. Mr. Kelly was well known in Union work in the metropolis, and had already fought several contests, receiving on each occasion a large measure of support. Mr. Sharples, who acted as returning officer, owing to the enforced absence of the President (in the chair at the Executive meeting), declared the result to be—

Kelly, ...	1,105
Cartwright, . . .	922
Majority, . .	183

Mr. Kelly will make an admirable member of the Executive, and his success will be peculiarly acceptable to the "outside associations." In the early days of electoral districts, Finsbury monopolised the representation, but it must be borne in mind that its representatives were Messrs. Shradrach Hicks, T. H. Jones, and A. A. Thomas, B.A. The appointment of the last-named gentleman, as Secretary of the Examinations Board, let in Mr. Thompson of Chelsea. Mr. Hicks was succeeded by Mr. J. J. Cullum, also of Finsbury, and now Mr. Kelly of St. Pancras completes the trio of members.

* * *

The Drill Question.

AFTER the "Model Course" had been mercilessly riddled in the House of Commons, a departmental committee was appointed to consider the whole question of physical exercises. Fortunately for the interests of both children and teachers, such stalwart Unionists as Messrs. J. F. Blacker and Marshall Jackman have accepted seats thereon. Evidence will be tendered by well-known educationists, and amongst these are Misses Broome and Selvage, and Messrs. R. N. Lewis, Pickles, Nicholls, and Wright, all members of the N.U.T. Executive. It would be difficult to select a more representative set of men and women, for amongst them are found masters and mistresses, heads and assistants, as well as teachers in urban and rural, board and voluntary, boys' and girls', and mixed schools.

A. C.

NOTES FROM THE NORTH.

Gift of £10,000 to Edinburgh.

THE Merchant Company of Edinburgh, who have charge of the greater part of the secondary education given in that city, have received intimation from Dr. Carnegie to the effect that he is willing to provide the last £10,000 of the £50,000 required for the new building scheme in connection with two of their large schools. The cause of education has in Scotland been peculiarly fortunate in receiving at the hands of several of its wealthy sons considerable amounts of

Next Month:

THE LANGUAGE COURSES ABROAD.

By a Special Correspondent.

money. Perhaps no gift to education in any country has done greater good than that now known as the Dick Bequest. By means of grants given to many of the schools in Aberdeen, Banff, and Moray, the Boards are able to secure the services of teachers of first-rate ability, with the result that many of the small schools in that district are able to do excellent work. Many "lads o' pairts" in these counties have been trained in, and passed straight from, these "Dick" schools to the university, and have taken their place alongside of scholars educated at some of the best higher schools. In addition to the Carnegie Trust, which now is doing so much for Scottish students, there are numerous bursaries and fellowships, the gifts of those who have evidently been of opinion that Scotland's greatest defence was educated sons and daughters. May education long occupy the high place in Scottish tradition that it has held in the past.

MR. J. HOOD, Clerk to the Port-Glasgow School Board, has prepared a most interesting memorandum on National Education in Scotland. In the main it may be taken as a defence of the present School Board system, and incidentally a reply to Doctors Douglas and Jones. He is of opinion that in some respects their proposal to reduce the number of separate public local authorities would create much more serious administrative difficulties than any at present existing. Among these he refers to the question of differential rating, and the necessity for delegation which would introduce into school management one-man rule. He thinks that even the worst small School Board, with its five members, would be less likely to mismanage than the single delegate of the County Council. The multifarious duties that many of these County Councillors would be called on to perform would militate against careful consideration and attention being given to education. The temptation to let questions like those of education which affect only inarticulate, uncomplaining children remain unconsidered would be very great, especially as the effects of negligence are very long in appearing. The conclusion of his well-reasoned though perhaps too highly coloured defence of the present system is that there is no alternative but to leave the School Boards alone.

Defence of School Boards.

THAT there are evils in the present system, however, Mr. Hood readily admits; but these are, he says, entirely due to the administrative methods of the Scotch Education Department, and to its determination to enforce a policy which is at variance with the provisions of the Education Acts. The remedies, then, briefly are: To have an Education Department that will administer the law, and not be a law to itself, and that will be under the effective—not merely the nominal—control of the House of Commons, and to secure this by having such arrangements made as shall secure that all minutes of the Department laid on the table of the House shall *automatically be set down for discussion, and discussed before they take effect.* He desires the Department to be made a committee of the House of Commons, so that it might become a real working committee, and no longer be merely the Secretary's "Mrs. Harris." He favours the appointment of an educational consultative council in Scotland, to whom all proposed changes in codes and other regulations could be submitted. Mr. Hood's contribution to the present discussion is indeed a valuable one; and while many of us may not be able to take the rosy view of School Boards that he does, yet it is well to have all sides of the question fairly stated and discussed. The pamphlet merits, and we trust will have, a wide circulation.

Mr. Hood's Remedy for Present Evils.

IT would appear as if the "rural" was now going to have an innings. There can be little doubt that in Scotland there is ample room for great improvement in the status and emoluments of the country teacher. The question whether the Institute has done sufficient for this class is one that may be differently answered. No doubt committees, who have done excellent work, have had the matter under frequent consideration; but have their findings been put to any practical result? We are inclined to say that too little has been done in this respect. Perhaps it may not be easy for the rural teachers to combine, and less easy for them to agitate. But still, if anything of a practical nature is to be done, we see no other way for them. The Institute, in the past, has not been in favour of splitting up into sections, but there is great need for sectional interests being attended to. The Ladies' and the Class Teachers' Committees have done, during the past two or three years, excellent work. No doubt there was much need for improvement in both directions, but is there not equal need for betterment in the case of the rural? The idea of making the annual Congress more effective in this direction has been mooted, and the opportunity of having this year's Congress in Inverness should not be lost in this connection. The teachers of the Highlands and Islands of Scotland should make a decided effort to put their interests in the forefront of the programme. The consideration of their peculiar questions should receive special prominence, so that in the future it may not be laid to the charge of the Institute that she has in any way neglected any section of the profession. It has been long felt by many of the active members of the Scottish Class Teachers' Association that the case of the rural teacher was a hard one, and some have even ventured to suggest affiliation with the latter, so that the interests of both, which in many respects are similar, might be advanced.

The Rural Teacher.

WE have just received a copy of the annual report of the Scottish Class Teachers' Association, and from it we learn that there has been a very gratifying increase in the membership for the year. At the end of last year there was a membership of 4,093, and this year the total has reached 4,736, an increase of 643. The Federation Council Report points out that the efforts of the Association have been directed against the modern tendency to look upon teaching as a trade, in which the work may be measured by the mere external performance or execution of its details. Its claim has been that every teacher should be maintained in the best physical and mental condition for the proper fulfilment of the demands of so high an office, and that an ample provision for life in the condition of the teacher would bring to the State the surest and quickest return. During the year there has been recognition by Government of the propriety of the work and aims of the Association, and further encouragement has been

The Scottish Class Teachers' Association.

afforded by the increasing readiness with which School Boards are now seeking information on various subjects at their hands. The reports of the various branches go to show a healthy and vigorous activity, and with few exceptions show a considerable increase in membership. Glasgow has now a membership of 1,948, an increase of 320, largely due, no doubt, to the necessity for action in connection with the recent measures of that School Board. The year on which the Association now enters is so evidently fraught with far-reaching and important possibilities—the proposed Education Bill for one—that the Council bespeaks the active co-operation and support of all class teachers.

* * *

E.I.S. Doings.

THE September meeting now looms in sight, and from all indications it is likely to prove one of more than usual interest. As referred to in last month's Notes, the question of new officials is likely to cause some discussion, and to lead to not a little play of feelings. We understand the finances, notwithstanding the heavy drain on them during the past year, are likely to show a substantial balance on the right side. It is a pity that the Institute still hoards up its funds, instead of devoting some of them to the acquisition of a central property of its own. No association of its importance in Scotland is so unenterprising. The Institute, however, seems to prefer to keep what it has. The president's address will most likely deal with the questions that have been exciting interest in the educational world during the year; and Circular 374 and its concomitant supplementary courses will come in for some plain speaking. The much-deferred and long-looked-for new Education Bill will hardly require a paragraph, as its production appears to be as remote as the Greek Kalends. As proof of this, it is worthy of remark that John Morley, in a recent speech on education in Edinburgh, hardly referred to education, but spoke at great length on the Fiscal Tariff. Little straws show how the current runs. The annual meeting of 1903 will still be able to devote its time to business; and the proposed legislation may at some future time absorb the attention of the E.I.S. delegates.

R. G.

THE LONG-DISTANCE SCHOOL JOURNEY.

EIGHT DAY EDUCATIONAL TRIPS FOR LONDON BOARD SCHOOL BOYS.

BY G. G. LEWIS.

THE short half-day school journey to local places of interest is now an established factor in our educational methods, and in many schools finds a place on the time table. Not all localities, however, are rich in points of interest, and even if such be the case, they tend to become exhausted. What teacher has not, whilst on a holiday in some distant spot, wished for the opportunity of giving his class the advantage of learning the lessons there provided?

Eight years the writer taught a physiography class, which he conducted on Saturdays to various quarries and places of interest for a little *real* nature study—that to be obtained in the field. But though interesting, the geological range of the London district is, after all, limited: the rocks are all stratified, and for the most part conspicuous by the absence of contortion, whilst examples of river action on a scale sufficiently small for teaching purposes are difficult to find.

On the other hand, there were the Malvern Hills, known to the teacher from his youth, composed of igneous, metamorphic, and aqueous rocks, lying side by side, and displaying all the forms of bending and twisting described in the text-books, but—130 miles away!

A tentative inquiry showed that at least a few boys could secure the 20s. asked for a week's trip, and the arrangements began to assume definite shape, till at last twenty upper boys accompanied their teacher on his first attempt at long-distance school journeys.

It must be confessed that this first trip (undertaken in the midsummer holidays) was not particularly enjoyable. The constant strain on one person of supervising twenty boys, wild with delight at finding themselves in the country, was very trying. It was impossible to be in two places at once, and the lads were frequently getting into mischief when alone. The little escapades were quite innocent ones, but they necessitated restraint and correction and a number of "you-must-not's." This, of course, reacted on the boys, and there was not developed on that first trip the delightful feeling of *camaraderie* between teacher and scholar which has distinguished our later trips.

But this first trip taught much. It showed that the long-distance journey was a possibility. One learned where to give the boys freedom; where it was necessary to impose restraint. It became evident that London boys visiting the country for the first time could not be trusted to go down by the river alone; that some would spend all their pocket money on the first day; that boys *will* play about in the bedroom; and that it required a very little larking to produce a great amount of damage.

But the chief thing brought home irresistibly was this—that the party *must* act together as one body, and that the teacher must always be with them. It does not do to arrange a day's outing and give boys the choice of going or remaining behind. They must be taught to join in with the majority cheerfully. Things were much better on the Forest of Dean trip the following year, when Mr. H. Longhurst joined the party. It soon became evident that the presence of a colleague brought a great lessening of responsibility, and led to much better relations between teacher and scholar. The selection of the Easter holiday instead of midsummer proved also to be a wise decision, the weather being cooler and much better for getting about.

On the third expedition, the staff was further increased by the co-operation of Mr. H. E. Turner, since which we have always worked together. We have found it an advantage to divide the work definitely, Mr. Longhurst, as treasurer, taking entire charge of the financial arrangements; Mr. Turner, as house master, looking after meals and discipline generally; leaving the organiser free to attend to the hundred and one little details of train arranging, excursion planning, and correspondence necessary to carry the party through a busy week without hitch or hindrance.

Judging by the larger numbers, the popularity of the annual Easter trip appears to have steadily increased. This year we were able to take forty-seven to Malvern for a week, and bring them back all safe and sound, better in health, and, we trust, with a good store of nature knowledge obtained at first hand.

So much then for the history of the development of the Bellenden Road educational trips. The writer proposes now to offer for the benefit of his fellow teachers the experience gained by organising eight of these tours, supplemented by a particularly enjoyable holiday spent with Mr. H. Edwards and some of his boys from the Arnot Street School, Liverpool, who are here shown outside their headquarters at Conway. Mr. Edwards also believes greatly in the value of the long-distance school journey, and has this year, for the eighth time, given up a large part of his midsummer holidays to this work.

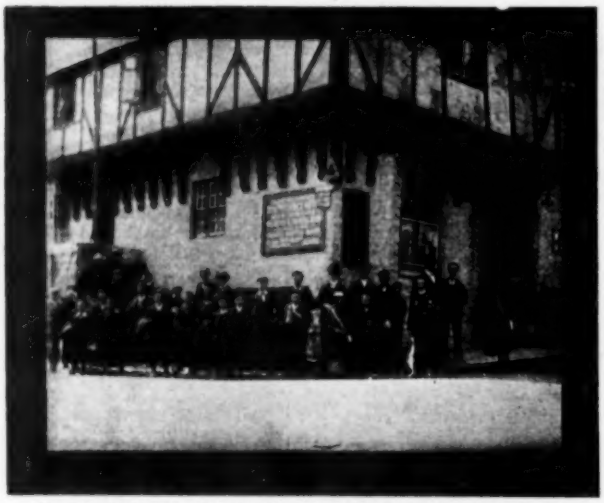
Choice of Locality.

This will be the first point to receive attention. A number of considerations must be taken into account. In our case we have aimed at securing a place possessing the following advantages:—

1. Entirely different class of scenery from that of the school district.
2. Interesting physical and geological features.

3. Rich historical and antiquarian interest.
4. A healthy situation within a 6s. or 7s. excursion fare (half return).

The district to be visited should either be well known to



LIVERPOOL BOYS AT CONWAY—OUTSIDE THEIR HEADQUARTERS.

at least one of the teachers, or thoroughly explored by a previous flying visit.

As London is rather flat, and many of our lads go to the seaside with their parents, we choose a hilly district in preference to the sea coast, and the Western Midlands are the nearest to supply our needs. Accordingly Malvern, Newnham-on-Severn, Chepstow, and Abergavenny have in turn been our headquarters, each possessing the essentials named above.

The chief difficulty will probably be encountered in

Finding a Home.

It is possible to board the lads out in cottages for 6s. or 7s. per week, but this plan has great disadvantages. The great pleasure of a week's outing consists in being *one* party, and if the trip is to be at all educational, means must be found to get the lads together in the evenings for revision of the work each day. We have found it difficult to gather the boys together in time for an early train from three different houses. What it would be if they were spread over a dozen it is hard to say. Mr. Edwards has come to the same conclusion: if some of the boys sleep out, a central room for meals and talks is of prime importance.

We have found temperance hotels with accommodation for large parties and beanfeasts the most suitable for our purpose. They are not likely to be busy at Easter, they are used to catering for parties, and they usually have at least one large room which will serve as a day-room for the young tourists. Rarely, however, have we found a hotel able to sleep us all, but the proprietor has been able to secure additional sleeping accommodation near at hand, sometimes by fitting up an empty house as a dormitory.

On asking proprietors to board and lodge the boys for 10s., it has generally been the sleeping-room which has caused them to hesitate. Provided we get good food—and we have so far fared excellently—we do not so much mind the boys being packed rather closely together at night for one week, especially as it is not oppressively hot at Easter. Three boys will sleep comfortably in the ordinary double bed, and another three can be put on a bed on the floor. As many as a dozen have sometimes turned in to a dining-room comfortably fitted up as a dormitory. In this way a temperance hotel of ordinary size can easily take thirty boys.

Getting the Money.

Having secured a home, the next thing is to induce parents to let the boys accompany us. At first they were reluctant to trust their boys away from home, but we get little of that now. The money question, however, is an important one with most of them. But it need not be insuperable if the lads start saving early in the year. Some boys earn 6d. a week by doing a little house work on Saturday mornings for the teachers, the poorest are *helped* by friends and managers of the school, but every parent is expected to contribute *something*. In some cases the boy is expected to secure 7s. himself, mother gives 7s. in lieu of the food saved while he is away, whilst father makes up the balance. Divided responsibility has procured many a boy the week's outing where a direct appeal to the father for a guinea would have met with a blank refusal.

Selecting the Boys.

At first we only took boys from the top class. Then the Sixth Standard boys were invited. Later, with fear and trembling, we took a few from Standard V. These young lads behaved so well that this year we made a selection from the Third Standard, who went through the whole of the programme. Provided a boy can wash and dress himself, and is in fairly good health, we do not mind taking him.

Circular Letter to the Parents.

Three months beforehand a hektographed letter is sent to the parent of each boy who expresses a wish to join the party. As this letter sets out the general idea, it is given with a few abbreviations. Many of the apparently unnecessary points touched on have been included as the result of practical experience.

BELLENDEN ROAD H.G. SCHOOL, PECKHAM, S.E.

Jan. 22, 1902.

EASTER EDUCATIONAL TRIP.

DEAR SIR (OR MADAM),—We are doing our best to arrange a seventh educational trip for the boys at Easter, but as there is some little difficulty in finding accommodation, I am anxious to know at an early date how many are likely to go, so that I can approach people with definite information.

LIVERPOOL BOYS IN NORTH WALES—ON SUMMIT OF FOEL FRAS (3,000 FEET HIGH).

I beg therefore to forward particulars of the proposed trip. If you wish your boy to join, kindly send a deposit of 2s. 6d. to

our treasurer, Mr. Longhurst. This will be returned if the trip for any reason falls through, but not if the boy is withdrawn after any arrangements have been made.

LIVERPOOL BOYS IN NORTH WALES—BATHE IN A MOUNTAIN POOL.

Cost.—£1, 4s.,* which will include railway fare, board and lodging, and certain excursions, *but not* drinks, sweets, postage, donkey rides, and other luxuries, for which at least half a crown pocket-money should be allowed. The teachers exercise careful supervision over all expenditure of pocket-money, and parents can therefore give more if they wish without being afraid it will be wasted.

Date.—Saturday after Good Friday, returning the following Saturday—that is, *eight days.*

Locality.—Abergavenny on the Usk, on the Welsh border.

Lodgings.—Mrs. Sayce of the Café Victoria will provide board and lodging for the party.

Food.—The following meals have been found to suit our purposes best:—*Breakfast:* Tea or cocoa (or milk), bread, butter and jam; eggs, 1d. each (extra). *Lunch:* Sandwiches and cake, taken with us on our journeys. *Dinner:* Hot meat and vegetables, with pudding—six o'clock, on our return. *Supper:* Biscuits or bread and cheese (if wanted).

Health.—We take such precautions against catching cold through damp clothes, etc., that parents need feel no anxiety on that score. Should, however, a boy develop serious illness, or get an accident, we wire to the parents and obtain the best medical aid available. Parents will, of course, understand that the £1, 4s. paid for the trip does not cover medical attendance, and the bill would be sent to them for payment.

Only once in six years have we found it necessary to call in a doctor. Boys almost without exception return much better for their outing. Each boy must take his overcoat, and it will be well also to take an *old* umbrella.

Objects and Advantages.—The Americans and Germans have for some years recognised the value of educational trips for their boys, and organise them officially in school time. Queen Victoria realised this also, and sent our King on long walking tours through the country with his tutor, followed by longer trips abroad.

Travel is one of the best means of acquiring knowledge, and in this Easter trip the lads not only travel, but do so under the guidance of those who know the boys, and who, having visited the district before, are ready at any moment to turn the objects of interest to educational use. Another important advantage is obtained by bringing the boys in contact with ladies and gentlemen who are often good enough to entertain them. Scarcely less valuable are the lessons of self-reliance and unselfishness which are invariably inculcated when the more robust life amongst other boys is substituted for the less rigorous routine of the home.

* This was the most expensive trip. The others only cost 21s.

Guide Book.—Parents are requested to note the contents of the Guide Book, which will from time to time be taken home, particularly the list of "*What to take.*" With a large party like ours it is essential that all should as far as possible be equipped alike and work together in every way. I shall be very pleased to give further information to any parent who will call and see me.

Preliminary Preparation.

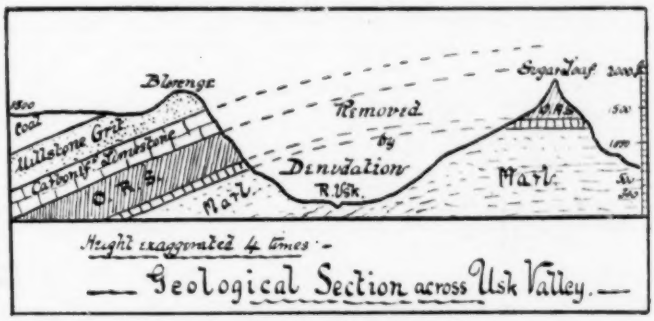
Previous to the trip the prospective tourists are called together occasionally at twelve o'clock for a little preliminary instruction. A raised cardboard map of the district is constructed by making tracings of the contours from the ordnance map. This serves to give them a good, general idea of the district they are about to visit.

The Guide Book.

Each boy is provided with a hektographed guide book of forty pages, which will be described more fully next month. We have tried many experiments with the guide book, and we have come to the following conclusions:—

1. It should be of such a shape and size as to enable it to be carried in a boy's topcoat pocket.
2. It should not be too bulky, and need only contain—
   - (*a*) Rules and time tables.
   - (*b*) Simple notes which boys may be expected to learn.
   - (*c*) Maps and diagrams for reference.
   - (*d*) Tables for cash accounts and marks.

With regard to size, we find $7\frac{3}{4}'' \times 4\frac{1}{2}''$ very convenient. The local printer, with his guillotine, cuts off about a couple of inches from the side of plain exercise books. The leaves are then untied and hektographed separately, being sewn up afterwards with stout thread, and covered by the boys with paper or cloth. The greatest importance is attached to the guide book—it is constantly consulted, and after the trip is over remains as a pleasing memento of the week's holiday.

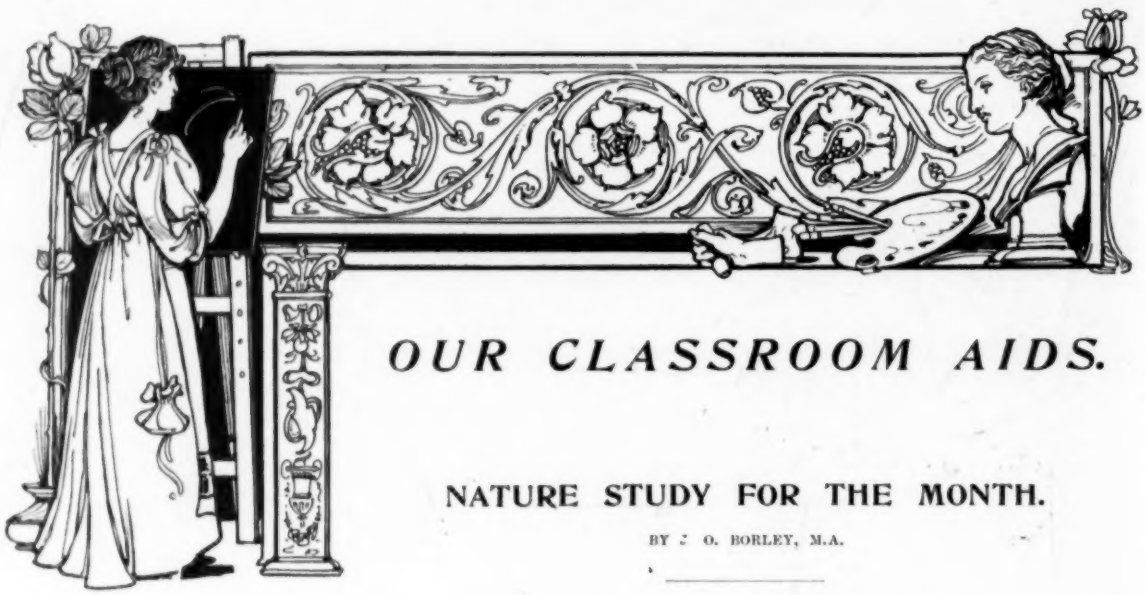


SPECIMEN PAGE FROM GUIDE BOOK.

Next month we propose to deal with the educational side of the school journey, illustrating by actual days "in the field."

PUPIL TEACHERS AND THE LONDON MATRICULATION LIST.—If any proof were wanting of the good work being done in the pupil-teacher schools, that proof would surely be found in the recently published matriculation lists of the London University. We will not quote the actual numbers, for in addition to the names of those who mention only a pupil-teacher centre as their place of preparation, there are many who have continued in training colleges the work begun in the centres, and the honours are divided. So, also, we find several who have laid a good foundation in secondary schools before proceeding to centre.

"MATRICULATION GUIDE."—We have received from the University Tutorial College a copy of the thirty-fourth *Matriculation Guide.* This little book sets out in a clear and concise manner the conditions which must be fulfilled in order to obtain a degree at London University, and gives very valuable hints as to the way to set to work, and shows how the private student may obtain the very best of expert advice. Intending matriculants should apply to the U.T.C., Cambridge, for a copy.



OUR CLASSROOM AIDS.

NATURE STUDY FOR THE MONTH.

BY J. O. BORLEY, M.A.

Lobsters, Crayfish.

OF the class Crustacea, to which the animals named belong, the most familiar member is the lobster, and it happens to be also the most convenient starting-point for a study of the group. We will therefore commence with it, or its near relative the crayfish, the same remarks and directions applying, as far as our limited scope of work goes, to either.

Crustacea all possess a segmented or ringed outer skeleton of chitin, the material of insects' "skins," strengthened in many cases, including all the above, by the deposition in it of chalk. Many, sometimes all, the segments possess a pair of appendages.

The lobster and crayfish lurk in crannies in the sea bottom or the banks of rivers respectively. Both walk in the semi-darkness over the water-bottom, seeking prey or carrion, which they apparently perceive by smell, and which they seize by their claws. In the case of the crayfish the obscurity can only be gained at night, and the creature is a night feeder. The claws also serve as a defence, but should an enemy seem too powerful, a flap of the tail under the body jerks the animal violently backward out of danger. Lastly, although each is a water animal, each can live for some time in the air. Crayfish are frequently sent some distance packed in moss.

So much for the roughest outline of its nature and habits. We will now proceed to inquire into the ways in which, by structure and function, the animal meets its requirements.

The external skeleton or shell requires for its perfection lime or some lime salt. It is well to make quite sure the existence of chalk in the shell by taking a shell for which one has no further use, and after breaking it up, putting it into a flask or test-tube, pouring on water and hydrochloric acid, and then closing the vessel with a cork whose delivery tube enters lime water. Gas bubbles through lime water and turns it milky, then again clear. An iron or platinum wire held in the liquid in flask will now colour red any flame in which it is put. Both these experiments should then be repeated with chalk and with lime, and will prove conclusively that the shell contains chalk, and that chalk contains something present in lime and a gas not present in lime. The result of this necessity for lime limits the distribution of the animals. They can only exist in rivers flowing over or proceeding from chalk (crayfish), and in the sea (lobsters). It would not perhaps be correct to say that crayfish could not exist without chalk, but undoubtedly, if they could live in such streams, they would lose their hardness, and, changing their habits, their structure would change also, so that they would become other than they are.

The study of the skeleton's form should start with the long so-called abdomen. Straighten out the body, and examine it from above. The abdominal segments are rounded, almost semicircular (lobster), somewhat triangular, with apex at back (crayfish). Bend the body. Between the hard segments softer skin can be discerned, which hence, when body is straight, must be packed in a fold below and within the harder parts. Turn the creature over. The body floor is seen to be above the lowest points of the sides, which thus remain or are produced down in flaps or folds called pleura.

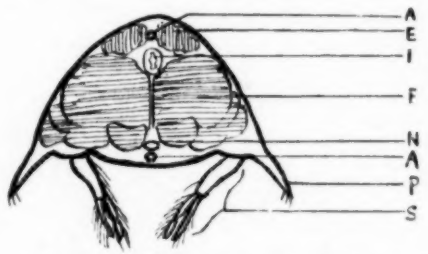


FIG. 1.—CROSS SECTION OF ABDOMEN OF CRAYFISH.
A, Arteries; I, Intestine; E, Extensor muscles; F, Flexor muscles; P, Pleuron; S, Swimmeret; N, Nerve.

These flaps shield the pair of jointed appendages which each segment bears. Each appendage, called here "swimmeret," being used for swimming, has a basal part giving rise to two terminal pieces side by side. Watch now the side of the animal, as the body is bent and straightened. It will be found that at a point midway down the side the sliding of the segments over and under one another does not occur. There is a pivot or hinge at this point. On looking at the interior of this shell when an opportunity occurs, this hinge may be seen, consisting of a knob-like front process fitting into a cup or socket of the back of the next segment. The play between any two segments is not great. The complete fold of the body is effected by the number of segments.

It will be well to find at once how this bending of the body is brought about. If with a stout pair of scissors the shell of a crayfish or lobster is cut above and below, along the middle line, and the contents divided cleanly along this line with a sharp knife, the intestine will be seen running along the middle, and above and below it white fibres, parallel to each other, but sloped forwards from the shell towards the intestine, making in consequence a series of V-shaped marks, point forwards. These are muscles, whose distribution is diagrammatically shown in Fig. 2. It is obvious that if the lower set shorten, the body bends into the position shown by dotted lines, while if these relax, and the top set contract, it straightens. Now as the bending is a means of escape from sudden danger, the lower set

("flexors" or benders) are far greater than the "extensors," or upper set. This accounts for the intestine, which lies between them, being nearer the roof of the shell than the floor, although the broad base of the body gives greater space for muscle than the roof. In spite of the overlapping of the segments in the extended state, the soft space between them remains rather a weak point when the body is flexed. It is interesting to note that the prawn and red shrimp remedy this by the excessive development of a segment that forms a shield for the end in the bent condition, though a hump on the back when the shrimp is walking.

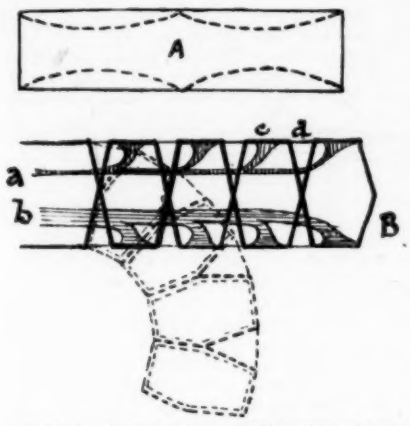


FIG. 2.—A, Strip of card showing, by dotted lines, the position of cuts to be made before bending it round to form a model segment. B, Model fitted up in extended position. *a*, Extensor muscles; *b*, Flexor muscles, diagrammatic; *c*, Hard segment; *d*, Softer skin at joint. Dotted lines show flexed position on contraction of *b*.

It is quite easy to construct a model to illustrate the flexion, and some may think it worth while to do so. To do this, a piece of calico should be taken, which, when rolled round a large round ruler, just makes a tube, and should be sewn or glued to make a tube. Now roll cardboard round the same tube, allowing a short overlap, straighten it out, cut it by transverse cuts into strips, and cut pieces from each strip to leave it shaped as Fig. 2 A, and after bending it into a ring, fasten it with paper fasteners, slip it over the calico tube, and fix it there with seccotine. Proceed similarly with another ring, and slip this on point to point with the first, so that the points just overlap; drive a pin through each to serve as pivot. Now pierce small holes at top and bottom of each segment; pass a string through each hole, with knotted end. These strings, carried out at one end of the tube, correspond to muscles, and their movement to muscular contraction.

Turn now to the appendages. The essential plan is, we have seen, a forked jointed rod. Now, where used for swimming, no great freedom, only a gentle to-and-fro motion, is required. The abdominal appendages have therefore few joints; and as the animal seldom swims, the area of the end joints or paddles is not great. But behind, on the end segment, the two parallel parts expand into relatively huge blades, which are used in the powerful backward dart, the motive power for which is furnished by the muscles of the whole body. Forward of the abdomen are four long, many-jointed limbs—many jointed, since, being ambulatory, much freedom of motion is required, but, as they are not used as paddles, *not* double at the end; the back pair are pointed, the front pair double pointed, but the points of the latter are not formed by parallel equal pieces, but by a peculiar arrangement, quite different. They are formed by the last joint but one, growing, as a kind of spur, along beside the last joint.

This arrangement is in the chelæ or claws, very much developed. The penultimate joint is of great size, and its spur, of extremely hard integument, curved so that the opposable end joint makes with it a formidable nipping machine. It is well worth while to cut (or, if using a large specimen, saw) the claw in half in the plane in which it opens and shuts. The reason of its square base is then apparent. Through the narrow joint connecting the two jaws of the pincers pass two strands of muscle. One widens slightly, and is fastened to the side of the penultimate joint which gives rise to the small jaw, while the other fans out enormously, and is inserted into the whole almost of the other side, the base, and the angle between these. The former of these muscles will obviously open the claws when it contracts, the latter will close it.

In front of the chelæ there are in all eight pairs of appendages, and in nearly all these the forked structure is maintained. Each should be removed, and placed in order upon a clean sheet of paper. If seized and gently pulled with fine forceps, while a sharp point of a knife is passed between the body and the first joint, they readily come away. Space does not allow of their detailed description: it may be said

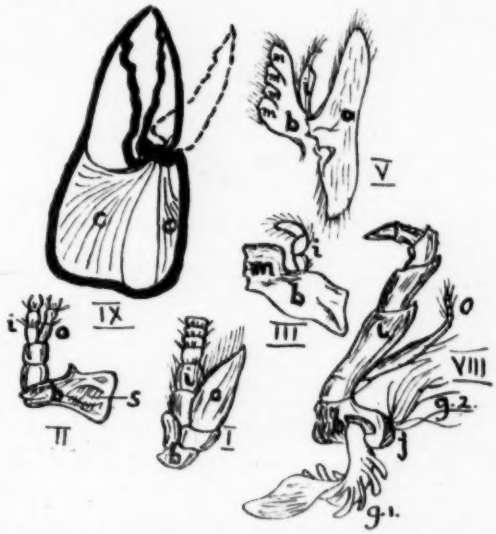


FIG. 3.—Certain appendages of crayfish, mostly rough copies from Huxley. Numbers show position from front backwards. Note diversity of form of *b*, Basal; *o*, Outer; *i*, Inner pieces of the forked limb; *m*, Masticatory ridges; *g* 1, Gill on basal piece; *g* 2, Gill on the joint *j*. The outer piece in V is the respiratory paddle. *c* and *o* in IX show diagrammatically the closing and opening muscles of the claw.

in general that in the next six, more and more as we go forward, the basal joint flattens out and becomes harder, the edge or face directed towards the centre becoming rigid: finally, the sixth is a mere horny jaw, with a little three-jointed process, a feeler armed with sensory hairs, which represents one of the two end pieces, perched upon it. It will in practice be wiser to study the gills before detaching these appendages; but it is simpler to describe them now.

These jaws and their ridged successors are all masticatory. Why such a formidable array? The crab or lobster lives frequently on living animals. These are caught by a sudden dart by the chelæ, and carried beneath the mandibles or jaws. Success largely then depends on the chelæ and their six predecessors and two successors dismembering and literally tearing the prey to pieces before it can resist or escape.

Forward again of the mandibles are the antennæ, antennules, and eyes. All are evidently sensory, for the first two named are, in life, constantly moved in front. Except the eyes, they are evidently formed on the same plan as other appendages, the long antenna being the inner terminal piece. They are very delicately sensitive to touch, and may be olfactory.

Look in the basal joint of the foremost pair or antennules for a small hole. A careful cut will show it to be the opening to a small sac. Fragments of grit are found in it, in a gelatinous substance, into which a good magnifying-glass shows hairs to project. The weight of the grit is thus partly borne by the hairs. The apparatus thus resembles an auditory organ. Should the water tremble with the vibration of

sound, the grit vibrates also, and communicates its motion to the hairs. Another use is very probable, however. The hairs on which the grit presses must be below it. This may give the creature a sense of balance and position. Indeed a naturalist has claimed to have proved it does act in this way. He took crayfish about to cast their shells, and when they had done this, placed them in clear water, having in it no grit but some iron filings. On a magnet being placed above or at the side of the tank, the animal lost all just sense of position, and tried to walk with its normally lower surface towards the magnet, having evidently placed the filings in the sacs. The experiment could not easily be repeated, as it is difficult to carry the animals safely through their shell-casting in captivity.

While looking at the appendages, it will have been noted that the sides of the head do not fuse with its under surface, though they curve in to meet it. With the animal on its side, find the point along the back margin of the head shield, nearest the animal's back, at which it is still free from the wall of the body. Cut forward along this line without injuring the body wall, and place in a dish under water.

The side of the head is now seen to have been a cover for several delicate white feathery processes, which are the gills. They are best seen in water, as they then float up. Their delicacy is their efficiency. Beneath their filmy walls the blood courses, absorbing through them oxygen from the water, and parting with carbon dioxide and other products of the actions of the body.

When the way in which they are packed has been noticed, the animal should again be turned on its back, and the appendages removed as directed. It will be found that some, but not all, the gills come with them. Some proceed from and are left on the side of the head. Indeed, three sorts of gills in all can be distinguished—(1), those attached to the appendages; (2), those attached to the point of junction of appendages and head; (3), those attached to the head itself. Special attention should be given to appendage No. V., counting the antennules as I. It bears a broad and elongated plate. In a living animal in an aquarium this plate can just be seen, from the front, below the gill cover (which we have in our dead specimen removed), waving ceaselessly to and fro. Its object is to urge a perpetual water current forwards from below the gill cover, so that fresh water is drawn up the slit between cover and head, to aërate the blood in the gills. The gills are confined to the three appendages behind and the two in front of the claws.

We have now been concerned for some time with the head, and it is time to consider for a little its real nature. It has been seen to bear many appendages, all paired, and all but the gills built on the same plan as those of the abdomen; while even the gills which are seated on the wall are serial in arrangement—one, or some signs of one, occurring above each of the four walking legs. It may be objected that the walking legs and some others are not now on the same forked plan as the rest, and hence that the above statement is inaccurate. The answer to this is that the more we know of the exceptions in question, the less exceptional do they appear. The walking legs of the embryo and very young, for instance, exhibit the forked plan; and occasionally an adult retains this condition.

From a comparison of abdomen and head, it is then plain that a portion of abdomen capable of bearing all the head appendages would consist of as many segments as there are appendages. Can the head be looked on as this number fused together? It seems impossible not to think so.

If we agree to do so, the comparison of lobster and insect is instructive. The insect divides its body into three main parts, the crayfish into two, yet both are in many ways similar animals. The advantage to the insect seemed to be specialisation of these parts for separate duties—mobile sensory part in front, locomotor part next, digestive and reproductive last. The lobster manages differently. If we may be allowed the conjecture, we shall perhaps go not far wrong in naming as one of them the efficient protection of the gills. These structures are very delicate. Access to them is gained only along a narrow slit in the lobster, and by an even smaller opening in the crab, in spite of the need of a good water supply for breathing; and even then we shall see the crabs often guard the gills by their own acts. If now we imagine the pleura of many segments fusing, they would constitute a far better gill shield than they could do separately.

However the arrangement arose, it is easy to see that the same advantages obtained by insect structure are, in a less perfect way, obtained by the lobsters. The mobility of the head, allowing for easy movement of the eyes in any direction, is impossible with a rigid fused head and body to reckon with. Accordingly, the eyes are on flexible stalks. The only violent motion the animal needs—the backward jerk—is carried out by mechanism, to which a whole division of the body—the abdomen—is given up. Lastly, the digestive and reproductive organs are given another special habitation—the space below the great head shield. It is impossible to touch on these latter organs here. Any wishing to study them in the best possible way should consult Huxley's book, *The Crayfish*.

One last word about the shell. It will be found to possess on its surface many knobs, spikes, and other sculpturings. These have an interesting history. They are the matted and consolidated remains, stiffened with chalk, of a clothing of hairs which arises outside the surface of living skin, and below the shell, and by its growth aids the animal in the very dangerous operation of shell-casting, which growth renders necessary.

It is hoped next month to deal in outline with crabs and hermit crabs.

NATURE KNOWLEDGE.

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LESSONS ON FOODS: SUGAR.

IT has already been shown that three-quarters of our solid food consist of carbo-hydrates—that is, the starches and sugars; and, further, that in digestion the starches are all converted into some form of sugar. This fact alone gives great importance to the study of sugary foods, apart altogether from the large part which sugar by itself plays in our diet of to-day.

Food sugars are divisible into two classes—the glucoses, represented by dextrose and levulose, as well as invert-sugar, which is a mixture of these two; secondly, the sucroses, represented by more familiar substances—namely, sucrose or cane-sugar, maltose or malt-sugar, and lactose or milk-sugar. The other sucroses and glucoses are of chemical interest only, and may be left out of account in this paper.

First, as to our sugar supply. Sucrose, or cane-sugar, is widely distributed among plants, and throughout all parts of plants, like starch; but our main sources of supply are from roots, stems, and fruit. As examples of sugar from stems, we have cane-sugar in the limited sense, and maple-sugar. All fruits contain cane-sugar, along with varying quantities of dextrose and levulose, while numerous edible roots, such as turnip, carrot, parsnip, contain sugar, though practically beet alone is grown for sugar extraction. At the outset it is important to note that there is no chemical difference between the refined products of beetroot and sugar-cane, and in this paper the name cane-sugar is given to refined sucrose, obtained from any source whatever.

Maltose, or sugar of malt, occurs not only in malt, but in all ripe grains, and is therefore of some consequence in baking and brewing. As has already been seen, it is formed within the body as a stage in the digestion of starch. Lactose, or milk-sugar, is the very important sugar contained in milk. Here it is kept in solution, and is not affected by rennet, so that it appears in whey and skim milk—the two products of milk most despised.

Samples for these lessons are easily obtained. A penny-worth of lactose may be had at any druggist's; glucose, both solid and liquid, may be had at any brewery for the asking; and an ounce of maltose may be ordered from any dealer in

chemicals. All these are for stock specimens—for exhibition rather than use—and a very little of them will go a long way. For experimental work, the teacher will want some common sugar in the following forms (¼ lb. of each):—Fine granulated sugar; crystalline sugar, securing crystals as large as possible; a lump of sugar candy on string, to show the shape of crystals and the method of their formation; lastly, some sticks of barley-sugar, both old and recent. Any wholesale grocer will procure a set of samples illustrating the extraction and refining of sugar, including such articles as a piece of sugar cane, crude "jaggery" from the crushing-mill, and specimens of raw sugar on its way to the refined forms. A small quantity of syrup and good treacle should also be at hand, and the druggist will supply for stock an ounce or two of burnt sugar. Abram Lyle and Co., of Greenock and London, supply school sets illustrating sugar refining.

Begin now with some common granulated sugar. Observe its appearance—small white crystals, the shape of which is shown better by crystalline sugar or by sugar candy. These ought to be in monoclinic prisms, but generally occur as tables with bevelled edges, and the class may endeavour to make them out by handling coarse crystals while the teacher cuts a large model in clay or soap. Sifting or icing sugar consists of very small crystals broken down by pounding. Show by experiment that it is an advantage to have small crystals when sugar is used in solution.

Put some granulated sugar—half a teaspoonful—into a dry test-tube, and warm over the flame of a spirit-lamp or bunsen burner, shaking gently so as to avoid cracking the glass, and holding the tube as nearly horizontal as possible, so as to give a large heating surface. Observe the changes due to heat. The sugar melts at 160° C. (320° F.); then at about 180° C. (365° F.) it passes into the glue-like condition called barley-sugar; then at 216° C. (420° F.) it gets dark-brown, becoming burnt sugar or caramel, and begins to give off vapours with a very characteristic odour; finally, at higher temperatures, it is thoroughly carbonised, showing that sugar contains a good deal of carbon (42 per cent.), and is therefore an important fuel or source of animal heat.

To show the pressure of carbon in sugar, as well as to demonstrate the force of the term "carbo-hydrate," perform the well-known experiment with sulphuric acid. Take a tablespoonful of sugar and dissolve it in the smallest quantity of hot water, so as to form a thick syrup or paste; then put this in a saucer, and pour on it a teaspoonful of strong sulphuric acid. The sugar rapidly darkens, froths up, forming a spongy mass of charcoal, with escaping jets of steam, while the characteristic odour of caramel is observed. The experiment may be done without water, in which case the steam can only be formed at the expense of the sugar itself, showing that sugar contains the elements of water.

Another very effective way of showing the fuel value of sugar is as follows:—Pound up a teaspoonful of saltpetre or chlorate of potash, and stir this thoroughly into a tablespoonful of granulated sugar. Put the mixture on an old slate or a piece of tinplate, and apply a lighted match; the mixture burns fiercely, almost like gunpowder. Careless housekeepers know the usefulness of sugar as a fuel when the kitchen fire refuses to kindle in the morning; and from all these experiments a class will have no difficulty in appreciating the value of sugar as a bodily fuel or heat producer. They will appreciate it better in another direction. By far the greater proportion of our food, even in a growing child, goes to maintain animal heat rather than to build up bodily tissue. But in young and rapidly growing children constructive demands are large, and there is, besides, an excessive loss of heat owing to the comparatively large body surface, so that these young folk demand an excess supply of food fuel, and no form is more acceptable to them than sugar. Fats, of course, are richer in carbon; but all children have an inherent dislike to fat, except in the form of fresh butter—fortunately the most digestible form of fat. The old family physician was therefore sound in his chemistry when he advised the mother of what may be called a large and small family never to hide the sugar basin.

Returning now to granulated sugar, let us see how it behaves in water. Put an inch deep of water in a boiling tube, and gradually add fine sugar till no more will dissolve. If the water and sugar be weighed, it will be found that one part of cold water dissolves twice its weight of sugar. Now transfer the water to a glass beaker, and heat it on wire gauze over a lamp, adding more sugar by degrees. It appears to dissolve without limit, giving a syrup of varying strength; and when this saturated syrup is allowed to cool, crystals of sugar form round the edges of the liquid, or the hot syrup may be poured into a cold plate so as to secure sudden cooling, when the whole mass turns solid, becoming a cake of "tablet," consisting of very small crystals closely packed together. An attempt may be made to show the formation of sugar candy by suspending threads in such a hot syrup; but such an experiment is not often successful, owing to the change of structure which sugar undergoes on heating.

Put some sugar in a pan with a little water, and heat with constant stirring to about 180° C.—that is, above the melting point of sugar. When the liquid turns yellow, allow a drop of it to fall into cold water or on a cold plate. If this hardens into the brittle crystalline form, the process is not complete; but whenever the drop remains yellow and soft, the sugar has been converted into a peculiar plastic form called *barley-sugar*. This is no longer crystalline, white, and brittle, but yellow and colloid, and so plastic that it may be moulded by the hand in any way. Children are familiar with the twisted sticks of barley-sugar sold by confectioners, and they should be shown that this is an unnatural form of sugar, so to speak, and returns to the crystalline form by slow degrees. An old stick of barley-sugar shows this by losing its transparency and yellow colour, and becoming encrusted with white opaque crystals of the ordinary sort.

Caramel, or burnt sugar, is obtained by heating cane-sugar, or dextrose, above 190° C., and similar bodies are produced by the roasting of bread and meat. It is very soluble in water, and is used for colouring soups and spirits—brandy, whisky, rum, vinegar, etc., all of which are colourless when pure. It has a very bitter taste, suggesting poor treacle or burnt bread, both of which substances owe their colour, odour, and taste to the presence of caramel. The dark colour of porter and stout is also caused by caramel, produced in this case by roasting malt. It cannot be reconverted into sugar, and hence poor treacle may be regarded as a waste product in sugar refining, consisting of caramels and uncrystallisable sugars. Such treacle is watery and very bitter, whereas molasses are thick, sweet, and highly nutritious, containing a good deal of sugar, crystallisable and otherwise. The laxative properties of treacle are well known.

A very important change takes place when sugar is heated with an acid, or even boiled for a long time without acid. This change is "inversion," and consists in splitting cane-sugar into two glucoses, dextrose and levulose, with loss of sweetening power, since glucose is only about three-fifths as sweet as cane-sugar. In order to show this change a chemical test is needed. Make a saturated solution of Rochelle salt, and add to it half its bulk of caustic soda solution. To this add slowly a saturated solution of copper sulphate (blue vitriol) until a blue liquid is obtained; this is the test solution. Boil some of this in a test-tube or white porcelain basin along with some glucose: a reddish deposit of copper oxide is obtained, showing the presence of glucose or other "reducing" sugar; but on repeating the experiment with cane-sugar no change occurs. If, however, the cane-sugar has been boiled with a little acid, or even boiled for some time in water alone, it produces some red copper oxide, showing that some of it has got changed into glucose. This is of importance in making preserves, when both acids and lengthy boiling come into play. As a class experiment, cane-sugar may be inverted as follows:—Make a solution of sugar in water of not more than 25 per cent. strength, and add to that one-tenth of its bulk of strong fuming hydrochloric acid. Heat the mixture till it reaches a temperature of 68° C., then allow it to cool; and if coloured, filter the solution through bone charcoal so as to get a clear liquid. This process "inverts" all the sugar into equal parts of dextrose and levulose.

HISTORY DAY BY DAY.

September.

1st. *Alteration of the Calendar, 1751.*—Through allowing one leap year in every four, an error had crept into the calendar. This had been rectified in 1582 by Pope Gregory the Thirteenth, and the Gregorian Calendar, which omits leap year at the end of each century, had been adopted by most European countries. Puritan England, however, refused to be guided by the Pope, and it was not till nearly two hundred years afterwards that the calendar was rectified by omitting the first ten days of the month and commencing September 11 after August 31.

2nd. *Battle of Omdurman, 1898.*—Following up his victory of Atbara (April 8), Sir Herbert Kitchener captured Omdurman, the Dervish capital, and completely routed the Kalifa's forces.

The Great Fire, 1666.—Thirteen thousand houses and ninety churches were destroyed in this terrible conflagration, which lasted three days.

3rd. *Cromwell's "Fortunate Day."*

Dunbar, 1650.—Almost for the first time, Cromwell was opposed by a leader of ability. Leslie resolutely refused to give battle, and Cromwell, marching through a deserted country, was obliged to rely on his fleet for provisions. A sudden movement by Leslie cut off his retreat, and he found himself completely hemmed in. To force his way through Leslie's line was impossible, and, wasted with sickness and famine, he was on the point of surrendering, when the zeal of the Scottish preachers compelled Leslie to leave his position and to give battle. Never was there a more disastrous mistake: in less than an hour the Scots were defeated; 3,000 were killed; and 10,000 prisoners, together with all the baggage and guns, were captured.

Worcester, 1651.—In spite of the defeat at Dunbar, Prince Charles prepared another campaign, and Cromwell was again opposed by Leslie, who employed the same waiting tactics. Mindful of his providential escape at Dunbar, Cromwell wished to shift the seat of operations to England; he therefore adopted the ruse of leaving the road to England open to Charles, who eagerly swallowed the bait and crossed the Border. The road to London being guarded, Charles made his way to the west, where Cromwell, sweeping round by Evesham, fell upon him and completely shattered his force.

Death of Cromwell, 1655.—Worn out with fever and the cares of state, Cromwell passed away on his "fortunate day."

4th. *The French Republic declared, 1870.*—The disaster of Sedan, when the emperor surrendered his sword, brought the Second Empire to a close, and for the third time France was proclaimed a republic.

5th. *Malta captured, 1800.*—The Knights of Malta were expelled by Napoleon, but the Maltese rose against the French garrison which had been stationed in the island, and compelled it to capitulate. They then ceded the island to Britain, which was confirmed by the Treaty of Paris.

6th. *The '15 rising, 1715.*—When Mar set up the standard of the Old Pretender he was at once joined by 6,000 Highlanders, who hoped, by restoring the Stuarts, to overthrow the hated house of Argyll.

7th. *Copenhagen surrendered, 1807.*—Having heard that Napoleon intended seizing the Danish fleet and using it against England, Canning coolly demanded that it should be delivered over to England until the end of the war. As the demand was refused, Copenhagen was bombarded a second time (see April 2), and after two days was compelled to yield.

8th. *Fall of Sebastopol, 1855.*—Feeling that he was only uselessly wasting human lives by remaining, Prince Gortschakoff set fire to the city and withdrew. "It is not Sebastopol which we have left to them," ran his dispatch, "but the burning ruins of the town, which we ourselves set fire to, having maintained the honour of the defence in such a manner that our great-grandchildren may recall with pride the remembrance of it and send it on to all posterity."

9th. *Battle of Flodden, 1513.*—Taking advantage of Henry's absence in France (see July 10), James the Fourth invaded England, but was met by the Earl of Surrey, and utterly defeated.

10th. *Battle of Pinkie, 1547.*—Both France and England were anxious to obtain the hand of the baby Queen Mary of Scotland for their respective heirs-apparent. The high-handed way in which, on the death of Henry the Eighth, Somerset advanced the marriage project, offended the Scotch Estates; and when, attempting to gain his end by force of arms, he defeated the Scots at Pinkie, Mary was sent to France to wed the Dauphin.

11th. *Malplaquet, 1709.*—Broken by one defeat after another, Louis had sued for peace on almost any terms, but he refused to accede to the demand of the allies that he should turn his troops against his own grandson. "If I must wage war," he said, "I would rather wage it against my enemies than my children." He raised another army, ill equipped and ill fed, but so stubborn and desperate that the victory of Malplaquet cost the allies 20,000 men.

12th. *Drogheda captured, 1609.*—"Our men," ran Cromwell's dispatch, "were ordered by me to put all to the sword. I am persuaded that this is a righteous judgment of God on these barbarous wretches." It is interesting to note that this awful massacre was carried out by the very men that had impeached Strafford for his "Thorough" System.

13th. *Quebec captured, 1759.*—Pitt determined to attack the French possessions in Canada. Three armies were organised—one to capture Crown Point and push on to Quebec from the south; one to capture Fort Niagara and approach it from the west; while the third, under Wolfe, was to sail up the St. Lawrence and attack it from the east. Wolfe's army was the only one to arrive at the appointed time; and as the others had not arrived by the fall of the year, he determined to make the attempt single-handed. By scaling the Heights of Abraham he was able to capture the city from its only assailable point, but he lost his life during the action.

14th. *Death of Wellington, 1852.*—No man ever served his country with more whole-hearted loyalty than Wellington. As a soldier he has had few equals, and although as a statesman he made many mistakes, he always had the confidence of the nation.

15th. *Moscow burned, 1812.*—Napoleon entered Russia at the head of 450,000 men, and having defeated the Russians at Borodino, entered Moscow and prepared to take up his winter quarters. Two days after, the city was fired by the inhabitants, and Napoleon found himself in the heart of a desolate country, with absolutely no provision for the winter, and was therefore forced to retreat. Of all that vast army only 20,000 reached the frontier, the rest falling from cold and hunger or before the swords of the wild Cossacks.

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(*c*) The side opposite the right angle is the longest (this is called the hypotenuse).

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We shall then discover that—

(1.) The hypotenuse is a diameter of this circle.

(2.) The middle point of the hypotenuse is equidistant from the angular points.

(3.) A line drawn from this point to the right angle divides the triangle into two equal but dissimilar *isosceles* triangles.

We might conveniently at this point consider the *acute-angled* triangle and the *obtuse-angled* triangle, calling attention to the fact that triangles may be named also according to some characteristic of the *angles*, as well as of the *sides*. The triangles we began with in the first exercise of Section A were named after their sides.

EXERCISE 2.—*Describe a semicircle on a line, AB, 3 inches long. Take a point, C, on the arc and join to both ends of the line, AB.*

Notice that we get a right-angled triangle, and that it is immaterial where we take the point C. There is one position of C which gives us *half a square*. Find it.

A semicircle is a *segment* of a circle, the chord being a diameter in this case; hence the right angle is called the *angle in a segment of a circle*, equal to a semicircle. The term "angle in a segment" will require careful explanation.

We may now use this fact to enable us to construct a right-angled triangle, having given—

(*a*) The hypotenuse and one side;

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It would be very interesting at this point to examine the angles in a segment which is not a semicircle, and discover that the angles in the same segment are all equal, but that the size of the angle depends on the kind of segment—for example, whether less, equal to, or greater than a semicircle.

We have here another example of a *locus*; the arc of a segment of a circle is the path of a point which moves so that the chord of the arc always subtends at this point an angle of the same size. With older pupils, too, we might refer here to the angle in the alternate segment.

EXERCISE 4.—*Using squared paper, construct squares on all the sides of a right-angled triangle.*

We may now demonstrate the relation that subsists between the area of the square on the hypotenuse and the sum of the areas of the squares on the other two sides. Numerical examples should follow this exercise, and reference might be made to the builder's method of obtaining a right angle.

The fact just learned may be used to—

(1.) Construct a square equal in area to two squares.

(2.) Construct a square equal in area to three squares, and so on.

If we take lines of definite length we may verify the results by calculation. Much time would be saved in exercises of this kind by allowing the use of the set-square in the construction of right angles.

HISTORY DAY BY DAY.

September.

1st. *Alteration of the Calendar, 1751.*—Through allowing one leap year in every four, an error had crept into the calendar. This had been rectified in 1582 by Pope Gregory the Thirteenth, and the Gregorian Calendar, which omits leap year at the end of each century, had been adopted by most European countries. Puritan England, however, refused to be guided by the Pope, and it was not till nearly two hundred years afterwards that the calendar was rectified by omitting the first ten days of the month and commencing September 11 after August 31.

2nd. *Battle of Omdurman, 1898.*—Following up his victory of Atbara (April 8), Sir Herbert Kitchener captured Omdurman, the Dervish capital, and completely routed the Kalifa's forces.

The Great Fire, 1666.—Thirteen thousand houses and ninety churches were destroyed in this terrible conflagration, which lasted three days.

3rd. *Cromwell's "Fortunate Day."*

Dunbar, 1650.—Almost for the first time, Cromwell was opposed by a leader of ability. Leslie resolutely refused to give battle, and Cromwell, marching through a deserted country, was obliged to rely on his fleet for provisions. A sudden movement by Leslie cut off his retreat, and he found himself completely hemmed in. To force his way through Leslie's line was impossible, and, wasted with sickness and famine, he was on the point of surrendering, when the zeal of the Scottish preachers compelled Leslie to leave his position and to give battle. Never was there a more disastrous mistake: in less than an hour the Scots were defeated; 3,000 were killed; and 10,000 prisoners, together with all the baggage and guns, were captured.

Worcester, 1651.—In spite of the defeat at Dunbar, Prince Charles prepared another campaign, and Cromwell was again opposed by Leslie, who employed the same waiting tactics. Mindful of his providential escape at Dunbar, Cromwell wished to shift the seat of operations to England; he therefore adopted the ruse of leaving the road to England open to Charles, who eagerly swallowed the bait and crossed the Border. The road to London being guarded, Charles made his way to the west, where Cromwell, sweeping round by Evesham, fell upon him and completely shattered his force.

Death of Cromwell, 1655.—Worn out with fever and the cares of state, Cromwell passed away on his "fortunate day."

4th. *The French Republic declared, 1870.*—The disaster of Sedan, when the emperor surrendered his sword, brought the Second Empire to a close, and for the third time France was proclaimed a republic.

5th. *Malta captured, 1800.*—The Knights of Malta were expelled by Napoleon, but the Maltese rose against the French garrison which had been stationed in the island, and compelled it to capitulate. They then ceded the island to Britain, which was confirmed by the Treaty of Paris.

6th. *The '15 rising, 1715.*—When Mar set up the standard of the Old Pretender he was at once joined by 6,000 Highlanders, who hoped, by restoring the Stuarts, to overthrow the hated house of Argyll.

7th. *Copenhagen surrendered, 1807.*—Having heard that Napoleon intended seizing the Danish fleet and using it against England, Canning coolly demanded that it should be delivered over to England until the end of the war. As the demand was refused, Copenhagen was bombarded a second time (see April 2), and after two days was compelled to yield.

8th. *Fall of Sebastopol, 1855.*—Feeling that he was only uselessly wasting human lives by remaining, Prince Gortschakoff set fire to the city and withdrew. "It is not Sebastopol which we have left to them," ran his dispatch, "but the burning ruins of the town, which we ourselves set fire to, having maintained the honour of the defence in such a manner that our great-grandchildren may recall with pride the remembrance of it and send it on to all posterity."

9th. *Battle of Flodden, 1513.*—Taking advantage of Henry's absence in France (see July 10), James the Fourth invaded England, but was met by the Earl of Surrey, and utterly defeated.

10th. *Battle of Pinkie, 1547.*—Both France and England were anxious to obtain the hand of the baby Queen Mary of Scotland for their respective heirs-apparent. The high-handed way in which, on the death of Henry the Eighth, Somerset advanced the marriage project, offended the Scotch Estates; and when, attempting to gain his end by force of arms, he defeated the Scots at Pinkie, Mary was sent to France to wed the Dauphin.

11th. *Malplaquet, 1709.*—Broken by one defeat after another, Louis had sued for peace on almost any terms, but he refused to accede to the demand of the allies that he should turn his troops against his own grandson. "If I must wage war," he said, "I would rather wage it against my enemies than my children." He raised another army, ill equipped and ill fed, but so stubborn and desperate that the victory of Malplaquet cost the allies 20,000 men.

12th. *Drogheda captured, 1609.*—"Our men," ran Cromwell's dispatch, "were ordered by me to put all to the sword. I am persuaded that this is a righteous judgment of God on these barbarous wretches." It is interesting to note that this awful massacre was carried out by the very men that had impeached Strafford for his "Thorough" System.

13th. *Quebec captured, 1759.*—Pitt determined to attack the French possessions in Canada. Three armies were organised—one to capture Crown Point and push on to Quebec from the south; one to capture Fort Niagara and approach it from the west; while the third, under Wolfe, was to sail up the St. Lawrence and attack it from the east. Wolfe's army was the only one to arrive at the appointed time; and as the others had not arrived by the fall of the year, he determined to make the attempt single-handed. By scaling the Heights of Abraham he was able to capture the city from its only assailable point, but he lost his life during the action.

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We may now demonstrate the relation that subsists between the area of the square on the hypotenuse and the sum of the areas of the squares on the other two sides. Numerical examples should follow this exercise, and reference might be made to the builder's method of obtaining a right angle.

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EXERCISE 5.—*Construct now equilateral triangles on the sides of a right-angled triangle.*

Find if the same rule holds as in the case of the square. (Use squared paper.) Construct an equilateral triangle equal in area to the sum of two others.

EXERCISE 6.—*Construct a square on the diagonal of a square.*

Show that it is *twice* the given square. Hence construct a square twice a given square. (Observe that we do not always need the squares in these examples; the sides alone sometimes suffice.)

EXERCISE 7.—*Construct a square on a line, say* 1 *inch long. Now make the line twice as long, and construct a square on that.* (Observe that it is four times the original square.)

By using squared paper we may do this exercise very rapidly, and also other similar ones, making the second line three, four, etc., times the original line.

We might now conveniently examine the acute and obtuse angled triangles with a view to finding out whether there is any connection between the area of the square on one side and the sum of the squares on the other two. With more advanced pupils the question might be thoroughly investigated with profit, but in a first course, such as this is meant to be, it is perhaps hardly desirable.

In order to fit the pupil to work miscellaneous exercises on the construction of triangles from given data, a little time might now be devoted to the consideration of those properties of triangles which it is useful to remember for this purpose. For instance, the fact that a triangle has six parts—namely, three sides and three angles—should be brought to the notice of the pupil again, and it should be shown that it is not possible to construct a definite triangle unless certain of these parts are known. The case when three *angles* are given should, for example, be contrasted with that when three *sides* are given, and so on. The relation of altitude to base, the simplification of the construction when regular figures are being dealt with, and the reduction of the data required in such cases, are all points that are worth consideration.

Section H.—Parallel Lines.

The pupil has already obtained some notion of what is meant by parallel lines when considering certain parallelograms he had constructed. It is important, however, that he should devote a little more attention to them. The ruled lines on a sheet of foolscap or on squared paper will serve to experiment upon, or he may draw two parallel lines by ruling lines along both edges of his straight-edge. By drawing a line from one to the other he will obtain four angles, consisting of two equal pairs, which are called the *alternate angles*. The equality of these he should test for himself. Having done so, he will now be in a position to attempt the following exercise:—

EXERCISE 1.—*Draw through a given point, P, a straight line parallel to a given straight line, XY.*

He should join P to some point, Q, in XY, and then make at P an angle, QPS, equal to the angle PQX, *so that these two angles are alternate angles.*

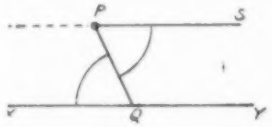


FIG. 1.

He should also make the angle QPS on the other side of QP, as in Fig. 1*a*, and note the result.

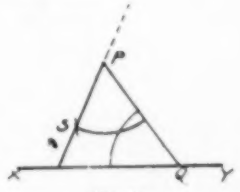


FIG. 1*a*.

In one position the line PQ joining two parallel lines would make right angles with them. This is the *shortest line* that can be drawn from one to the other, and is what is understood by the distance between two parallel lines. We may now use this fact to enable us to draw a line parallel to another at a given distance from it by erecting perpendiculars of equal length on the given line (on the same side of it), and drawing a line through their extremities.

EXERCISE 2.—*Draw a line parallel to another, at a distance of* 1 *inch from it.*

The perpendiculars may be drawn with the set-square. The method of drawing parallel lines by means of set-square and ruler might be taught now, and the pupil permitted to use it, when not instructed to the contrary by the teacher.

Since all the kinds of parallelograms have been dealt with in more or less detail in foregoing section, little remains to be done with them here except to recapitulate their properties and to give miscellaneous exercises upon them, noting especially how many elements are required to define a parallelogram, as we did in the case of the triangle.

There is one point which should be brought out clearly on account of its frequent application in mechanics—namely, the fact that a given parallelogram can have only *one diagonal* passing through one of its angular points, but a given line may be the diagonal of an infinite number of parallelograms whose adjacent sides are coterminous.

The fact that the parallelism of its opposite sides is the fundamental property of a parallelogram should be emphasised, and that all the other properties depend upon this. Most of these have been considered in preceding sections.

An interesting exercise which might be taken now is that shown in Fig. 2. A series of parallelograms are drawn with their adjacent sides equal, but the angle between them varying. The exercise consists in determining the change in the area of the parallelogram as the angle varies. The angle may also be taken greater than a right angle.

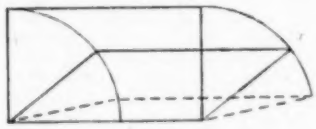


FIG. 2.

The exercise should be worked on squared paper.

Section I.—On Areas.

Squared paper is almost indispensable for this section. Taking a piece of squared paper we draw two parallel lines, say one inch apart, and drawing two lines at right angles to these and between them, two inches apart, obtain a rectangle, ABCD.

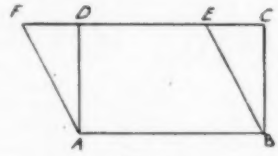


FIG. 3.

Now, by drawing two parallel lines from the base, AB, of this rectangle (Fig. 3), we may obtain the parallelogram ABEF. It is easy to show that the two figures have the same area by counting the squares. In the case of this figure we might do it also by cutting out the portion BCE of the rectangle, and placing it at the other end obtain the parallelogram. Several parallelograms should be drawn in this way on the base AB, and the areas shown to be equal to that of the original rectangle. It is possible now to satisfy the pupil that—

(1.) A parallelogram and a rectangle on the same base and between the same parallels are equal in area.

(2.) That parallelograms (which are not necessarily rectangles) on the same base and between the same parallels are equal in area.

It is not a difficult step, and need not be described here, to show that—

(3.) A parallelogram on the same base and between the same parallels as a triangle is double the triangle in area; and

(4.) That two triangles on the same base and between the same parallels are equal in area.

We may now imagine these same figures capable of sliding between the parallels, or we may cut one out and move it some distance from the other, keeping it between the parallels. No essential conditions have been altered, so that it is evident that—

Triangles and parallelograms on *equal* bases and between the same parallels are equal in area.

We have also seen that the perpendicular distance between two parallel lines is always the same. Hence two triangles which have the same height could be put between the same parallels, and if their bases are the same their areas will be equal. The same applies, of course, to two parallelograms with the same height and equal bases.

The following exercises may now be taken in this connection :—

EXERCISE 1.—*Make a rectangle equal to a parallelogram in area, and find the area of the parallelogram* (by measuring the sides of the rectangle).

EXERCISE 2.—*Find the area of the rhombus in Exercise* 2, *Section A.*

EXERCISE 3.—*Construct a rectangle equal to a triangle, with sides* $2\frac{1}{2}$ *inches*, 3 *inches, and* $1\frac{1}{2}$ *inches respectively.*

EXERCISE 4.—*Construct an isosceles triangle equal to the scalene triangle of Exercise* 3, *and find its area.*

EXERCISE 5.—*Divide the scalene triangle of Exercise* 3 *into two equal triangles.* (Draw a median.)

Of course two triangles with equal bases in the same straight line and the same apex must be between the same parallels. If, then, we divide the base of a triangle into any number of equal parts, and join the points of division to the apex, we divide the triangle up into a number of equal triangles. At present we can only divide a line into parts which are multiples of two. Hence—

EXERCISE 6.—*Divide a triangle into four equal triangles by lines drawn from the vertex.*

(We have already divided a triangle into four equal triangles by another method.)

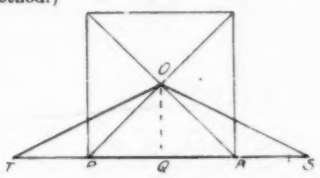


FIG. 4.

EXERCISE 7.—See Fig. 4.

TP = PQ = QR = RS.

Triangle TOS = four times the triangle POQ, and is therefore equal to half the square. Hence—

Construct an isosceles triangle equal to half a square in area and half its height.

EXERCISE 8.—*Construct an isosceles triangle equal to a square and having the same altitude.*

The reduction of a quadrilateral to a triangle of equal area, and then to an equivalent isosceles triangle or rectangle, may be taken now. For details consult any book on practical geometry. In this way the area may be actually found, and if the work is done on squared paper the result may be verified.

Many other simple exercises on areas should now be given for practice. Suggestions for such will be found in any text-book of practical geometry. Whenever possible, examples capable of solution arithmetically should be given, and the results verified by using squared paper. This makes the work much more interesting.

Section J.—Proportional Division of Lines.

The following exercise, which is the key to many that follow, deserves careful attention, as it introduces a new idea to the pupil —namely, that of proportion, and one which is, moreover, of great importance.

EXERCISE 1.—*Construct a triangle ABC with sides as follows: AB*=6 *cm.*, *BC*=6 *cm.*, *AC*=3. *Divide AB into three equal parts* (*each* 2 *cm.*) *at D and E* (Fig. 5). *Draw DF parallel to BC.*

Now measure CF. It will be found to be a third of CA, just as BD is one-third of BA.

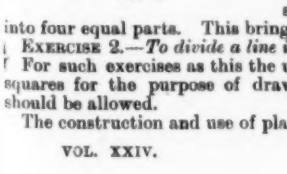


FIG. 5.

AC is divided at F just as BA is divided at D. If we draw a parallel through E, EG, AG is one-third of AC—that is, AC is divided similarly to AB. If there had been four equal divisions in AB, and we had drawn lines through the points of division parallel to the base BC, we should have divided the line AC into four equal parts. This brings us to the useful exercise,—

EXERCISE 2.—*To divide a line into any number of equal parts.*

For such exercises as this the use of the parallel ruler or set-squares for the purpose of drawing a series of parallel lines should be allowed.

The construction and use of plain scales naturally falls into its place here, and is a part of the subject which deserves to be well done.

Referring again to Exercise 1 of this section, we might show that the four lines AD, AF, AB, AC are four proportionals. If it has not been done already, this would be a very suitable place at which to teach proportion in the arithmetic course, the examples in geometry and arithmetic being worked side by side. The figure of Exercise 1 enables us to get at the solution of such problems as the finding of (1) a fourth proportional to three given lines; (2) a third proportional to two, and the mean proportional between two, the last of which is extremely important. Such exercises in graphic arithmetic as finding a product, a quotient, a square or square root of quantities represented by lines, which arise out of the above, might very well be taken at this stage, always, of course, working the problems arithmetically side by side with the geometrical constructions. (For details consult the text-books.) The great thing is not to hurry over the preliminary exercises of the section, which are all-important. The applications come easily and naturally, provided the principle is fully understood; and this remark applies to all the sections. Space forbids my doing more now than just suggesting the order in which these exercises ought to be taken; and it is scarcely necessary to do more, after the detail that has been given in preceding articles. The reader will therefore refer to the text-books for details concerning the exercises alluded to.

Section K.—Similar Figures.

Though examples of similar figures have occurred already, they have in all cases been figures that were both *equal* and *similar*, and the discussion of similar figures in a more general way has either not been possible or would not have been profitable till now.

If we refer again to the figure of Exercise 1 of Section J we see that the triangle ADF has its angles equal to those of the triangle ABC, and the sides about equal angles are proportionals. All this requires careful explanation and verification. Triangle ADF is said to be *similar* to triangle ABC. A simpler way of expressing the same thing, but which is not so exact, is to say that the triangle ADF is an exact copy of the triangle ABC, but on a smaller scale. We might reverse this and say that ABC was an exact copy of ADF, but on a larger scale. Also the triangle ADF if placed in front of the triangle ABC in a certain position would seem to cover it *exactly* (coincide with it). Such statements will help to a fuller understanding of the meaning of similar figures. (A reference to enlarged photographs might aid the beginner.) The parallelism of the sides of the two triangles should be specially noted, since this gives us at once a method of obtaining similar figures.

If we add to the triangle ABC another ACH, as in Fig. 6, we obtain a quadrilateral. If now we draw FK parallel to CH we obtain a triangle AFK similar to ACH, and the quadrilateral ADFK is similar to the quadrilateral ABCH, because its angles are equal to those of the larger quadrilateral, *and its sides about those angles proportionals.* The sides of the two are also parallel or coincide, which amounts to the same thing; and we might imagine ADFK moved away from ABCH, so as to lie always parallel to itself. We must now show, however, that parallelism of the sides is not alone sufficient to produce similar figures; nor is equality of angles. This is pretty evident from a consideration of two rectangles, which may be easily shown not to be the same shape, though their sides may be parallel; and their angles are always equal, being all right angles. We could quickly construct several on squared paper—some that were similar (the squares helping us to get the sides the right length), and others that we could easily show were not similar.

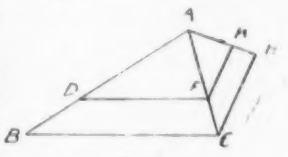


FIG. 6.

Many examples will be found of the application of this notion of "similarity" to practical problems. I will just add a few, and refer the reader to text-books for others.

(1.) The construction of a regular polygon (say, a pentagon), the diameter being given.

(2.) To place an equilateral triangle in a square with one side parallel to a diagonal.

(3.) To place an equilateral triangle round a square.

(4.) To place a square in a pentagon.

Section L.—The Ellipse.

Even in an introductory course like the present it is advisable that we should include an elementary knowledge of the ellipse.

As in all previous sections, we leave the pupil to discover for himself, as far as possible, the chief properties of the figure, and the method of construction.

The best way to introduce the subject is to teach him to construct ellipses by means of a piece of thread, two pins, and a pencil. This is a very interesting exercise, and serves as the starting-point for a series of others equally interesting, by which we discover the more obvious properties of the ellipse. The pupil should be instructed to move the pins (the foci) nearer together, or farther apart, keeping the length of string the same always.

Some of the points to be noticed are :—

(1.) That the sum of the distances of the moving point of the pencil from the foci is constant, hence an ellipse is the path of

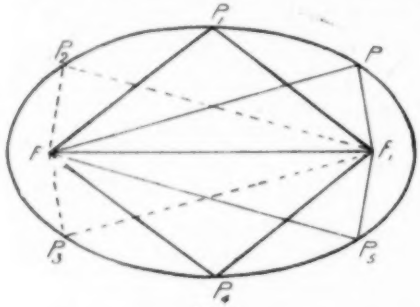


Fig. 7.

a point (as P, Fig. 7) which moves so that the sum of its distances from two fixed points (the foci, F, F_1) is always the same.

(2.) The nearer the foci, the more like a circle the ellipse becomes; the farther apart, the more elongated the ellipse. (See Fig. 8.)

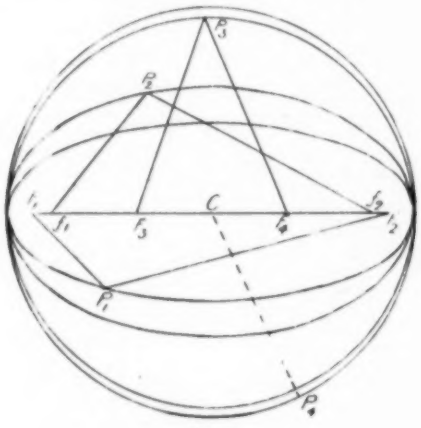


Fig. 8.

(3.) In one extreme position the ellipse becomes a straight line, in another a circle. The circle and the straight line may be regarded as special cases of the ellipse.

(4.) By joining a series of points on the curve to the foci, and joining the foci also, we get a series of triangles having the same base (Fig. 7), and the sum of the lengths of their other sides constant; hence we arrive at a method of getting points on the curve of an ellipse, when we know the distance between the foci and the *sum* of the distances of a point on the curve from the foci.

This is how the ellipse should be constructed in the first place (after having been drawn by means of thread in the way already described), the triangles being actually drawn as in Fig. 7, the exercise being repeated afterwards, and unnecessary lines omitted (as shown in text-books). It is easy to see that four points, as P, P_2, P_3, P_5, will correspond to the same triangle. The extremities of the major and minor axes should also be found.

When this has been grasped, the main difficulty connected with the ellipse has been got over; and when sufficient practice in construction has been given, the other simpler properties may be investigated, and especially should they be compared with the corresponding properties of the circle, the latter being looked upon as a special case of the ellipse.

The construction of ellipses in rectangles and parallelograms not rectangular may be deferred till a later stage. It would be interesting to approach these exercises by first describing a rectangle about an ellipse obtained by the method just described, and then directing the class to obtain the lines (like those shown in Fig. 9) usually found first in the construction given in the

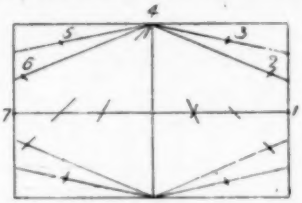


Fig. 9.

books in such exercises, and thus they would ascertain how nearly the curve agrees with the points given by the intersection of these lines.

The fact that we get ellipses when we section a cone in a certain way should on no account be overlooked. It would be interesting to let the pupil verify for himself that the boundary of such a section was the curve of an ellipse, by letting him transfer it to paper, and finding the foci, obtain points on the curve. He would be sure to be interested in the fact that a practically similar section gives us a circle, thus affording further evidence of the closeness of the relationship between the ellipse and circle.

It is hardly necessary to point out the desirability of referring at this point to the orbits of the planets, which are ellipses with the sun at *one* of the foci.

This would, I think, be enough on the ellipse for a preliminary course; but it is quite necessary that something should be known about the properties of so important a figure, which so frequently turns up in solid geometry, and in model and freehand drawing.

This concludes the course I have endeavoured to sketch out in this and the three preceding articles. If conscientiously carried out it will, I think, be found to be productive of good results. I know from experience that geometry taught in this way is intensely interesting to the learner, and that is certainly worth consideration. The reader will have noticed how largely the experimental element has been introduced: this is one of its chief recommendations, and if due regard is paid to this feature, the subject may be made to serve, to some extent at any rate, as a substitute, though perhaps a poor one, for elementary practical physics in places where the latter is quite out of the question.

It might be of service to those who contemplated making some use of the scheme I have outlined, either in its entirety or in part, to indicate how I think the course may be best divided up for the purposes, say, of an elementary school. Suppose we begin with the third standard—and an intelligent third standard would easily grasp what is included in the two earliest sections—we could then divide up the work as follows :—

Standard III. Sections A and B (with, of course, many easy supplementary exercises).

Standard IV. Sections A and B repeated, with Sections C and D added.

Standard V. Sections A to G.

Standard VI. The whole course.

Or if we began with the fourth standard we might end with the seventh.

Want of space has prevented me saying anything about the teaching of solid geometry, which I consider one of the most important subjects taught in the upper sections of our schools, affording, as it does, a species of mental exercise that is not to be got from any other subject. I would merely suggest that it might conveniently be introduced after the section on the right-angled triangle, when most of the necessary preliminary geometrical notions will be fairly familiar to the pupil.

I have been anxious in these articles to indicate the method of teaching the subject rather than the matter which should constitute such a course of elementary geometry, though some attempt has been made to show what sort of exercises ought to be regarded as forming an essential part of a first course. One of the principal aims I have had in view has been to show that exercises ought to be grouped round one fundamental problem, out of which they may be made, by suitable operations, to grow.

In this respect the grouping of the exercises is very different from that met with in many text-books. We may see in these books, for instance, a number of problems placed together under the heading, "Description of one rectilinear figure within other," in spite of the fact that there is often very little that is common in the method of solution.

Our Modern Language Section

INTRODUCTORY.

WE have for some time had under consideration the possibility of doing more to aid the large number of our readers who are endeavouring to extend their knowledge of modern languages. The question of greater efficiency in the teaching of modern languages has for some time occupied the serious attention of educational reformers in this country, and to such good effect that the old-fashioned methods are being gradually replaced by others of a more rational and practical nature.

On the question of our national shortcomings with regard to the knowledge of foreign languages most people are agreed, and those most competent to express an opinion unite in thinking that we do not get an adequate return for the amount of time and effort consecrated to language study. One of the greatest hindrances to improvement lies in the fact that we generally underrate the amount of effort necessary to acquire a foreign tongue. To "pick up" French or German is a phrase we are all familiar with, and the idea that a modern language can be acquired in a casual way is accountable for the shoals of text-books which profess to teach a modern language, pronunciation included, in a ridiculously small number of lessons. Professor Sweet, one of the greatest authorities on the teaching of languages, says: "Nothing will ever make the learning of languages easy; it will always be a difficult and unnatural process—unnatural, because it involves constant conflict with the associations of the learner's native language."

The practical benefits which would accrue to a commercial nation like our own from a more widely-extended knowledge of modern languages are too obvious to need insisting on, but as instruments of culture they deserve a higher place than is usually accorded them. The student who rightly aims at acquiring an accurate knowledge of his own language will find that a knowledge of tongues closely allied to his own will help him to acquire a deeper and more critical knowledge of his mother tongue. A knowledge of German will help to throw light on many difficulties which beset the student of the history of the English language, and the application and etymology of many words in daily use cannot be fully appreciated without the light thrown on them by the languages of our nearest neighbours on the Continent.

A knowledge of at least French and German opens up to students of philology and science a wider range of facts and speculation than would be possible if they were ignorant of those languages. Those who study modern languages as a recreation have at their command sources of delight which are denied to the man to whom these languages mean nothing. Good as a translation may be, the graces of style which make half the charm of a literary production are to a great extent lost in the process of translating. Those who are able to read in the original the *Provincial Letters* of Pascal, the *Sermons* of Bossuet, the *Satires* of Boileau, the *René* of Chateaubriand, the *Salammbô* of Flaubert, the *Faust* of Goethe, the *Don Carlos* of Schiller, the *Divina Commedia* of Dante, the *Orlando Furioso* of Ariosto, and the *Promessi Sposi* of Manzoni, to mention but a few works, can alone realise their full charm and beauty. "Le style, c'est l'homme," says Buffon, and however much the translator endeavours to enter into and express the spirit of the original, the individuality which a writer of genius puts into his work must be to a great extent lost in the process of rendering it in another tongue. To know the languages of the nations which have given birth to writers of enduring fame is to increase greatly our means of self-culture, to be able to enter intimately into views of life and modes of thought and feeling which differ from our own, and to acquire a breadth of view which is often denied to the ordinary insular Englishman.

We have endeavoured to make the present batch of papers interesting to students and teachers generally. They have been written by men fully competent and of wide experience, and deal with various aspects of modern language teaching. We invite our readers to put themselves in communication with us if they can suggest any way in which we can assist them in their studies. We can assure them that their suggestions will receive most careful consideration from us. In connection with our new departure, we have made arrangements for giving assistance by post to those of our subscribers who come across any difficulties which they cannot surmount. The only conditions we impose on those who seek our help are—(1) *The coupon of the current number of the paper must be sent with the letter;* (2) *a stamped addressed envelope must be sent for reply.* If these conditions are fulfilled, we can guarantee a speedy and, we trust, a satisfactory reply.

HOW TO GIVE THE FIRST LESSONS IN FRENCH.

BY ALEXANDER CRAN, M.A., PH.D., D.LITT., ROYAL HIGH SCHOOL, EDINBURGH.

DO you speak French with your pupils from the beginning to the end? How do you get a start? How do you proceed with your first lesson? Do you begin with the first lesson in your book?* Have you no preliminary exercises? These and such like are the questions often put to myself and others who advocate the new method of teaching modern languages.

In order to show how we teach the very first stages of the subject, we shall try to explain what we do with a class of beginners in the Royal High School, Edinburgh, during the first two months of their study of French. As we shall not have space enough here to write down all the actual lessons given during that period, we propose to give one or two on each preliminary stage of the subject, so as to show how the one leads up to the other.

We need scarcely say at the outset that the teacher must be able to speak French with some fluency, but under our method he *does not* necessarily speak French with his pupils in his first lessons.

The "natural method," as understood by us, is not, in the strictest sense, the process by which children learn their mother tongue, although based upon it. We do not hold the opinion that all instruction from beginning to end should be in the foreign tongue, just as if English were not in existence. Our "natural method" is one that is at least practicable in our schools and in large classes. Common-sense must be brought to bear on the teaching of a language, as in other things. We must take into account the age of our pupils. The learner is not a child of eighteen months or two years, and hence the stage of his intellectual advancement is different. The boys in our school begin French at ten years of age. The classes average from thirty to thirty-five. The method we adopt is the one which we

* Nelson's *Object Lessons in French.*

ELEMENTARY FRENCH OBJECT LESSON WALL SHEET.

Reduced Specimen. Size of Sheet, 21 inches by 31 inches.

6. Monsieur, Madame, les Enfants et les Domestiques.

consider best suited to the mental advancement of the pupil—one which will evoke all his powers of mind. In the earlier stages we give special attention to the training of the *ear*, the *voice*, and the *eye*. Let the beginner hear the sound of the language he is learning from the very first, and let everything be done to make him speak it, and think in it, so that he may really feel that it is a living language to him.

Children should, if possible, begin French by the time they are ten years of age. At that age the vocal organs are still flexible and the perceptions acute, so that they acquire pronunciation more easily, and make more rapid progress in the practical use of the language. At this age their interest is keen, and they are eager to enter into the life and spirit of the foreign tongue. As pupils of this age have already some knowledge of the elements of grammar, we introduce a little grammatical training from the first. But let us remember that, after all, methods and books are in themselves dead matter, and are only of secondary importance. It is the teacher who puts life into the method and book. He makes the class what it is, and no method can take his place.

First Lesson.

EXERCISE 1.

a e i o u.

The master will write these letters on the blackboard or make use of Chart I. He will then take his pointer and point to one after the other of these letters, giving clearly

6. MONSIEUR, MADAME, LES ENFANTS ET LES DOMESTIQUES.

(PICTURE LESSON.)

NOTE.—The teacher will give a preliminary exercise similar to that explained in Lesson 1 before entering on this one. Here the pupil must distinguish between such words as **mademoiselle** and **demoiselle**, etc.

Master, then *Pupil*.

Voici la **mère** avec un enfant dans les bras. La mère est la **joie** de la **famille**. Elle est très heureuse. Elle est **tendre**, bonne et attentive pour les enfants. Cette **dame** est la mère de cette petite fille (*pointing to the little girl*).

Le père de ces enfants est le **mari** de cette dame. **Madame** Dujardin est la **femme** de Monsieur Dujardin. Voilà madame et voilà monsieur (*pointing to them*).

Voici **Mademoiselle** Dujardin. Cette **demoiselle** est la **sœur** de la petite fille.

Conversation.

Quelle (*or* qui) est cette dame, Charles?—C'est la mère de la petite fille, monsieur.

Et la demoiselle, Henri?—C'est la sœur de la petite.

Le père est-il là, Louis?—Oui, monsieur, voilà le père (*pointing to him*).

Qui est la femme de ce monsieur?—C'est Madame Dujardin.

Montrez-moi Mademoiselle Dujardin, Georges. — Voici Mademoiselle Dujardin, monsieur.

Combien de sœurs a-t-elle, Charles?—Elle a deux sœurs, monsieur.

C'est bien. *Master*, then *Pupil*.

Voilà la **servante** de cette dame (*pointing to the lady on wall-sheet*).

Voilà la **cuisinière** de cette dame.

Voilà la **bonne** de l'enfant.

Voilà la **couturière** de la mère.

Conversation.

Quelle est cette femme, Georges? (*pointing to the cook*).—C'est la cuisinière, monsieur.

Où est-elle?—Elle est dans la **cuisine**.

Et celle-ci?—C'est la servante.

Qu'est-ce que cela, Henri? (*Teacher points to the cat.*)—C'est un **chat**, monsieur.

Où est le chat, Charles?—Le chat est dans la cuisine, monsieur.

VOCABULARY.

La femme, the wife, the woman.
La mère, the mother.
La famille, the family.
La fille, the daughter, the girl.
La demoiselle, the young lady.
La dame, the lady.
La servante, the servant.
La cuisinière, the cook.
La bonne, the nurse.
La couturière, the dressmaker.
Bonne (*masc.* **bon**), good.
Jeune, young.
Belle (*masc.* **beau**), pretty.
Comment, how.
Le chat, the cat.
La cuisine, the kitchen.
Le mari, the husband.
Madame, madam or Mrs.
Mademoiselle, miss.
La joie, the joy.
Tendre, tender, affectionate.
Attentif (*fem.* **attentive**), attentive.
Pour, for, to.
Combien, how many, how much.
Celle-ci, this one.
Heureux, happy.

GRAMMAR.

(*a*) THE DEMONSTRATIVE ADJECTIVE.

Masc. sing.	**ce, cet**	*this* or *that.*
Fem. sing.	**cette**	
Plural	**ces**	*these* or *those.*

Ce is used before masculine nouns beginning with a *consonant*—**ce** *livre*. **Cet** is used before masculine nouns beginning with a *vowel* or *h mute*—**cet** *enfant*, **cet** *homme*. **Cette** is placed before any feminine noun—**cette** *dame*, **cette** *encre*. **Ces** is the plural for both genders—**ces** *hommes*, **ces** *femmes*.

Use wall-sheet, and drill in these forms.

(*b*) To form the feminine of adjectives ending in **f**, change this letter into **v** before adding **e**—*attenti***f**, *attenti***ve**. If ending in **x**, change this letter into **se**—*heureu***x**, *heureu***se**.

For exceptions to these rules see Lesson 15.

Exercises.

1. Write the French name of each of the figures on the wall-sheet.
2. Place *ce*, *cet*, or *cette* before the nouns in vocabularies 1 to 5. Write the same in the plural.
3. *Translate into French as a Home Exercise.*—Is this man good? (*translate*, This man is he good?). These girls are very young. That cook is in the kitchen. This young lady is very attentive. The husband of this lady is very tall. Where is this cat? It is in the kitchen. These boys are the sons of this gentleman. These girls are very happy. These boys are attentive.

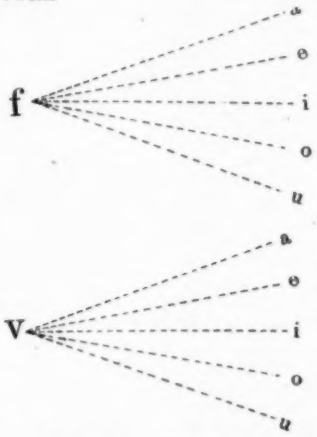
at the same time the sound of each. Now let the whole class repeat after you and with you. Proceed in this manner until you are satisfied that the class as a whole have acquired the correct sound of each of the vowels. Now call up a pupil, put the pointer into his hand, and ask him to do as you did. Another pupil is called up. And thus the lesson is worked over until every pupil can repeat from the chart or blackboard, in concert and individually, the whole lesson.

Do the same with the consonants. We shall begin with *f* and *v*, thus:—

EXERCISE 2.

f = fff^{e} v = vvv^{e}.

Make the pupils now read these consonants along with each of the vowels.



fa fe fi fo fu.
va ve vi vo vu.

Let the teacher work this exercise into his pupils by following the same process as in Exercise 1.

Second Lesson.

EXERCISE 1.

It will be similar to Lesson 1. We shall begin with the consonants **c g**.

He will explain to his class that these consonants have each two sounds—**c** hard (*k*) before *a*, *o*, *u*, and **c** soft (*s*) before *e* and *i*. The same observation will be made regarding *g*, thus:—

Like *k* **ca co cu.**
„ *s* **ce ci.**
„ *gue* **ga go gu.**
„ *je* **je ji.**

EXERCISE 2.

ph ch.

ph = fff^{e} and **ch = ch^{e}.**

Then join to each of the vowels as before, thus:—

pha phe phi pho phu.
fa fe fi fo fu.
cha che chi cho chu.

EXERCISE 3.

gn and **ill** sounded as one letter.

gna gne gni gno gnu.
illa ille illi illo illu.

Similar exercises on the remaining consonants will follow, but always in pairs, thus:—**l t; m n; x z; b d; p h; r s; j k**, etc. This will perhaps be as much as time will permit of for the first lesson.

After several such lessons on the charts published by

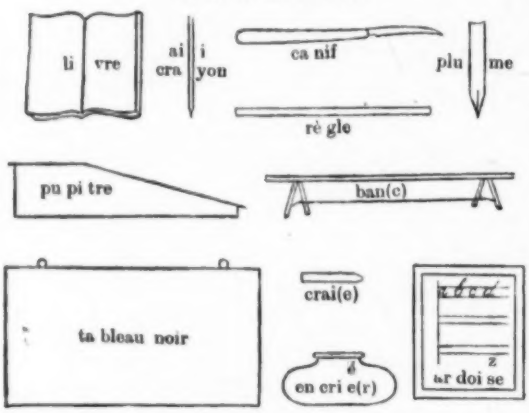
Nelson (reduced copies of which will be found in *Elementary Object Lessons in French*, p. 145), the pupil reaches the second stage of study. So far it is the imitative faculty of the pupil that has been exercised. In the following lessons mental activity will be added to imitative. We now pass from syllables to words. **He is to learn words, not through other words, but through the association of the actual things with these words. He is to learn to think, and to do so in the foreign tongue as far as possible.** He is, in fact, to acquire a sense of language. He is now prepared to commence "Object Lessons in French."

First Object Lesson.

EXERCISE 1.

We prefer to give the first lesson on objects to be found in the class-room. Here again we use the blackboard, on which the teacher will draw outlines of such objects as "book," "pencil," "pen," etc.

BLACKBOARD SKETCH.



Each word should be divided into syllables, thus—Li-vre, ca-nif, ban(c), ta-bleau noir, rè-gle, ta-ble, fe-nê-tre, plu-me, pu-pi-tre, crai(e), ar-doi-se, cra-yon, en-cri-e(r).

The method of teaching such a lesson will be evidently the same as in Lesson 1. The preliminary exercises already given from the charts will enable the pupil to pronounce any ordinary word, even without the teacher's help, or he may, as before, point to the object and ask the pupils to name it in French. If they are fond of drawing, let the teacher write some of these French words on the blackboard, and ask his pupils to reproduce sketches of the object.

A grammar lesson on the article will now be given. Use the same blackboard sketch, but add le or la, un or une to each word—le livre, un livre, l'encrier, un encrier, etc. For this purpose the wall-sheets will be found very useful, and exercises of this kind on single words with the article should be given on the pictures in each lesson.

EXERCISE 2.

In this exercise we still use the same objects and same blackboard sketch, but if the teachers prefer it they may use the first wall-sheet,* and after making them, as before, repeat simultaneously *with the article* the French names of the various objects, etc., in these pictures, he may now introduce such simple expressions as c'est, voilà, voici, où est ? etc.

Voilà la porte. Voilà la fenêtre. Voilà le banc. Voilà le tableau noir. Voici la plume. C'est le livre, etc.

Both teacher and pupils will take part in such exercises. Questions may now be put in French as follows. The pupil will at the same time point to the object while answering.

M. Où est la fenêtre ? *P.* Voilà la fenêtre. *M.* Où est le crayon ? *P.* Voilà le crayon. Etc.

* This will introduce them to and prepare them for the first book lesson.

Third Stage—Second Object Lesson.

Now is the time to put the little book into their hands. I mean *Elementary Object Lessons in French* (Nelson). I have already written two specimen lessons for the *Practical Teacher*, in order to show the method followed out at this stage (see Vol. xviii., July 1897), and all that I propose to do here is to add a few remarks in answer to some questions that have since been put to me by teachers using this book. We shall take, as an illustration, Lesson 6, p. 23, here reproduced. I have been asked the following questions:—

1. Is this intended as a lesson in reading?—It may be used as an exercise in *reading*, but it is meant, in the first place, to be a lesson in *speaking*.

2. Are such exercises suitable for large classes?—If the class is large, so much the better. There will be all the more life and animation. There must be life in the teacher, in the pupil, and even in the book.

Hang the wall-sheet on the blackboard, which you place in front of your class. Stand up before your class. Tell them you are going not to *read* but to *speak*, and that it is French you are going to speak. Take your pointer, and pointing to the different persons in it, say slowly and distinctly, monsieur, madame, les enfants, les domestiques. Write these words in large letters on the blackboard. Now point to each person, and ask your pupils to give the French names. You may now proceed with the lesson. The teacher will first describe the picture in the words given in the text-book. Let it be *speaking*, not *reading*, and point to the wall-sheet on which all eyes are fixed. Repeat and repeat until all have caught it up. Use every means to help them to understand you without speaking much English. This is a *speaking* lesson, if we may so call it, but it is the teacher who speaks in the first instance. The pupils' turn is coming. Let the teacher now write the lesson on the blackboard, and at the same time divide each word into syllables as before, thus—Voi-ci la mè-re a-vec un en-fant dan(s) les bras. La mè-re est la joi(e) de la fa-mi-lle, etc.

The master will now ask the pupils to fix their eyes on the blackboard whilst he reads the lesson. They will then repeat it simultaneously after him. They will now be able to read the lesson from their books in the usual way. In this way excellent results in reading will be got.

The pupils will now have an opportunity of speaking French in the lesson which follows on conversation, and although both question and answer are given in the text-book, neither teacher nor pupil need be confined to these alone, for example:—

M. Avez-vous encore votre père, Henri ?
P. Oui, monsieur, j'ai encore mon père et ma mère.
M. Montrez-moi le père de cet enfant, Jean.
P. (*pointing to the wall-sheet, he says*), Le voilà, monsieur.
M. Quelle est cette dame, Charles ?
P. C'est la mère de la petite, monsieur.
M. Avez-vous une petite sœur, Jean ?
P. Oui, monsieur, j'en ai deux. Etc.

In all this the usual exercises in grammar, translation of easy sentences into French, and dictation are not to be neglected, but given at the proper stage of study. We have been told it is a hard method for the teacher. We have used it for several years, and found it delightful and easy for both pupil and teacher. Others, again, will tell us that the conversation turns upon trivial subjects; but this, although necessary at first, need not be so beyond the rudimentary stage more than in any other branch.

UN Italien racontait, avec une ostentation ridicule, ses voyages dans les diverses parties de l'Europe. "J'ai été," disait-il, "oun' ann' à Petersbourg, oun' ann' à Vienne, oun' ann' à Stockholm." La maîtresse de la maison, que ce détail ennuyait, lui dit: "Je vois qu'en dernière analyse, vous avez été un âne partout."

HOW TO ACQUIRE A GOOD ACCENT AND THE POWER OF CONVERSATION IN FOREIGN LANGUAGES.

IT is too often supposed that there are considerable drawbacks in the way of acquiring conversational power in a foreign language without spending some time in the country where the language is spoken. There can be no doubt that, given certain conditions, which we shall dwell upon later, residence in a foreign country is a powerful aid towards acquiring the ability to converse with ease and correctness in the language of that country, but it is by no means an uncommon thing to find Dutchmen, Danes, Swedes, and even Belgians having a good command of spoken English without having passed a day on English soil. So far as our experience goes, this is much less the case with Germans, who, as a rule, only speak foreign languages at all well if they have had the opportunity of residence abroad. Once when staying for the night in a hotel at the top of an Alpine pass, we happened to come across a Dutchman who spoke English with absolute ease, and with a very good command of well-chosen expressions. On our asking him how long he had lived in England, he surprised us by saying he had only been in London on one occasion for a few days. On further inquiring of him how he had managed to acquire such a good command of really idiomatic English, he informed us that he regularly read the sermons of the late Rev. C. H. Spurgeon.

The little incident narrated above merely furnishes a particular instance of the general truth that most good linguists learn nearly everything from books and but little from conversation. If we are learning a modern language with the aim of speaking it eventually, we must accustom ourselves from the beginning to pronounce correctly what we read and write in that language. If we defer our study of the pronunciation until we have made some little progress in the language, we shall find that almost unknown to ourselves we have been associating some sounds, in all probability incorrect ones, with the words we have been writing, and the wrong associations we have thus created will be very difficult to destroy. The private student, for whom we are particularly catering in these papers, too often becomes an easy prey to charlatans. Stinted in time, and usually stinted in means, he buys a book which professes to perfect him in the accidence, syntax, and pronunciation of the language in a very short time. It is impossible to learn the pronunciation of a foreign language in this way. In the absence of a generally-accepted phonetic alphabet, the symbols of which should possess the same value in all the languages to which they apply, there are many sounds in foreign languages which cannot be represented by English letters. Examples of such are the *u* sound in the French *mur*, the nasal sounds *an*, *en*, *aim*, etc., as in *sang*, *Indien*, *faim*, and in German the umlauted vowels, *ä*, *ö*, *ü*, as in *Männer*, *Löcher*, *Bücher*, the guttural *ch*, as in *Bach*, *noch*, and the palatal sounds in *ich* and *Gefecht*. Even if the compilers of pronouncing grammars and dictionaries would agree amongst themselves as to what combinations of English vowels and consonants should be taken as representing the sounds of such words as those quoted above, there would still be the danger of cross associations being created between the normal pronunciation of the combinations of letters used to represent the foreign sounds, and the arbitrary values given to these combinations for the special purposes in view. Moreover, books which profess to teach pronunciation by this method entirely overlook the intonation and rhythm of a language—points of no less importance than its pronunciation.

It cannot be too strongly insisted on that practice in reading with correct pronunciation should be insisted on in the beginning. It is in the pronunciation of a foreign language that the Englishman often fails lamentably. There are two reasons to account for this. One is that it is difficult to induce him to take the necessary trouble. He seems to fear that he will make himself ridiculous if he tries to talk as foreigners talk. Hence he gives vowels in French the values they would have in English; he pronounces pure vowels as if they were diphthongs; his nasals, instead of being stopped sounds, all end in *ng*; he always puts the tonic accent where it would be placed in English, and he speaks with a drawl. In German he has less difficulties, as the tonic accent in most cases falls where it would in English, but he frequently treats the gutturals with supreme contempt, and fears to give the long vowel its full value. If you intend to speak a language well, you must *take trouble* over the pronunciation in the early stages of your study. The second reason for the Englishman's ill success is that he is usually unacquainted with phonetics. In the metropolitan district only a comparatively small number of people would be able to pass the test of pronouncing satisfactorily the vowels in such words as *baby*, *bone*, *field*, *foul*. The analysis of the formation of ordinary sounds, and the proper disposition of the vocal organs to imitate these sounds, should be taught in the early stages of school-life. A student who has undergone a training in practical phonetics will be able to attack the unfamiliar sounds of a foreign language with much more success than a person who has not received that training.

In the case of a student who cannot go abroad, we always recommend that *for the pronunciation* he should have recourse to a native teacher or to a perfectly competent Englishman. One is not always sure, however, of getting the classic pronunciation of a language from a native teacher. We have heard of illiterate persons who have failed in England in some other occupation setting up as professors of language, and teaching a dialect of their native tongue. A southern Frenchman, with his peculiar intonation, or a German, speaking, say, the dialect of the Rhine province, would make very bad models for imitation. We would therefore warn students to ensure as far as they can that the teacher they select shall be an educated man whose pronunciation is correct. There are many Germans in this country who teach French in addition to their native language, but we do not, as a rule, recommend any one to go to a German teacher for French pronunciation. A German rarely pronounces French well, and the student who has got beyond the period of childhood does not need any one to teach him the grammar of a foreign language. In most of our large towns there are many admirable conversation classes for foreign languages. To join one of these is much less expensive than taking private lessons. Be under no illusion as to the extent of the benefit you can derive from having a native teacher to yourself, or from joining a conversation class conducted by a native teacher. The utmost that can be done for you in one of these ways is to teach you to recognise the sounds of the foreign language when they are spoken, and to criticise your own imitation of the sounds uttered by the native teacher. In default of a regular training in phonetics, you can at least listen carefully, watch how your teacher uses his vocal organs to produce the sounds he utters, and then endeavour to imitate them. But you must acquire for yourself the raw material you are to use in conversation. Four leading points of method must be borne in mind. 1. *There must be constant and varied practice in the chief peculiarities of the language.* 2. *Never learn rules, but only illustrations of them.* 3. *No peculiarity of the language must be learned as an isolated fact, but always in a sentence.* 4. *Exercises must be read aloud several times with correct pronunciation before being written.* By this intensive method a student makes rapid and solid progress in speaking a foreign language. We propose to illustrate below how the first three directions given above may be carried out in learning French and German.

We assume, to begin with, that the student is sufficiently in earnest to face the drudgery of learning the irregular verbs. If he is not, he had better give up altogether. After he has mastered them he should keep steadily revising and re-revising them, giving seven or eight minutes each day for that purpose. When he revises and re-revises he should say over *aloud the whole tense* in which there is a peculiarity. Thus, with *faire*, instead of saying *fais*, *faisais*, *fis*, *ferai*, etc., he should say *je fais*, *tu fais*, *il fait*; *nous faisons*, *vous faites*, *ils font*; *je faisais*, etc. So with *kommen*, he should not merely say *kam*, but *Ich kam*, *du kamst*, *er kam*, *wir kamen*, *Sie kamen*, *sie kamen*. This

method demands trouble and time, but we are only catering here for the student who is in earnest.

The difficulties of gender will disappear if the article is always learned with the noun. For instance, in a vocabulary which the student has to learn he comes across the words *fleur* (*f.*), *champ* (*m.*). He says aloud, *la fleur, la belle fleur, cette fleur sent bonne*, etc.; *le champ, je traverse le champ, j'ai cueilli des marguerites dans le champ*, etc. So in German, *Baum* is masculine and *Pferd* neuter. The student repeats aloud, *der Baum, der hohe Baum, ein alter Baum, alte Bäume*, etc.; *das Pferd, ein wildes Pferd, das andere Pferd, andere Pferde*, etc. In this way he exercises himself on the forms of the adjective as well as on those of the noun. Instead of learning long lists of exceptions to the rule of formation of the plural, or, as in German, lists of nouns which do or do not umlaut the vowel in the plural, the student should make little phrases and sentences, introducing the words he is learning, and working in with them what he has learned already. In this way he will acquire the power of sustained conversation in the language.

So in studying neuter verbs he will construct and *repeat aloud* a few illustrative sentences for each verb—for example, in studying *sortir*, he may say, *Je suis sorti pour visiter un ami; tu es sorti à l'heure; il est sorti pour faire quelques emplettes; nous sommes sortis par un beau temps*, etc.; or in German, *Ich bin gekommen um Ihnen eine Frage zu stellen; du bist zu spät gekommen; er ist während meiner Abwesenheit gekommen*, etc. In like manner for the transitive uses of these verbs he will invariably construct sentences—for example, *Le fermier a rentré ses foins; après quelque hésitation il a sorti de sa poche une pièce de cinq francs*, etc.

In French the construction of negative, interrogative, and negatively-interrogative forms of the verb must be abundantly and variously illustrated, as, *vous ne craignez pas ses menaces, craignez vous ses menaces, ne craignez vous pas ses menaces, ne crains pas les menaces d'un si vil homme*, etc. Now use the negative and interrogative forms with reflexive verbs, both in their simple and compound tenses, as, for example, *il s'est trouvé au rendezvous, il ne s'est pas trouvé au rendezvous; ne nous sommes nous pas trouvés au rendezvous*, etc. Then distinguish the direct reflexives from the indirect reflexives, as, *nous nous sommes efforcés de rire; nous nous sommes dit bien des choses.*

Space will not allow us to illustrate this method as fully as we should like, but as points for special treatment we recommend, in French, the relative positions of direct and indirect pronominal objects (*me le, te le, le lui*, etc.), used with simple and compound tenses, and affirmatively, negatively, interrogatively, and negatively-interrogatively, the conjunctions which govern the subjunctive, the positions of the pronouns *en* and *y*, and the distinctions between the verbs requiring *de* and those requiring *à* before an infinitive following them.

By treatment such as that we have been describing the difficulties of the separable and inseparable verbs in German will disappear. Instead of learning that the inseparable particles are *be, emp, er, ent, ver, zer*, etc., let him put these separable and inseparable particles to work, as, *Ich bewundere seine grossen Thaten; Ich gebe Ihnen zu dass meine Schwester Recht hat*, etc. Even at the risk of wearying our readers, we repeat the direction to say these sentences aloud.

The construction of the compound verb will also require abundant illustration, as well as the position of the direct object when the predicate is a compound verb, and the position of the predicate, both simple and compound, in sentences introduced by the subordinative conjunctions *als, dass, da, indem*, etc.

Every peculiarity of syntax—as, for example, the uses of *sondern* and *mehr* in German, and the inversion of subject and predicate following an introductory *aussi* in French—must be treated in a similar way. Proverbial and idiomatic expressions should also be built up into appropriate sentences constructed by the student himself.

One of the difficulties often encountered by the student who learns a foreign language at home is that he does not become acquainted with the ordinary everyday expressions and terms which are indispensable to the traveller and the business man. His training in the language has had too much of a literary character. To supply this deficiency some admirable books are published. Kron's *French Daily Life* and *German Daily Life* are excellently designed for the purpose of filling up this gap. Hachette and Co. also publish some very good helps in this direction. Hermann Lange's *Household German*, published in two parts, is an excellent work. Of less value, but still very good, are Chardenal's *French Conversations* and *French Exercises for Advanced Students*, published by the same firm. The latter work contains very good collections of proverbial and idiomatic expressions in French. The materials given in these books must be worked up into sentences by the student himself, if he is to assimilate them at all.

The student who has acquired a fairly good conversational power in a foreign language by working on the lines suggested above will find great benefit from attending one of the many Holiday Courses which are now held in France, Germany, and Switzerland. For further information as to these, readers are referred to several important contributions on the subject which have already appeared in our columns, and also to a specially written paper to appear in our next issue. It must be remembered, however, that without constant reading a student ceases to make progress. When he ceases to read, not merely does he stand still, but he begins to go back. Some valuable hints as to books and newspapers which he can read with pleasure as well as with profit are given elsewhere.

We have now to consider briefly the question of residence abroad for the purpose of learning a foreign language. This is an advantage which few of us can enjoy. It may, however, be an advantage only to a very limited extent unless proper precautions are observed. To enjoy the advantages of residence abroad the student must have undergone at home a thorough preparation in the language he wishes to perfect himself in. He must go to a place where he will meet with few natives who speak his own language. If he does not, he will find that the foreigners will be continually practising their English on him, and that he will get few opportunities of practising the language he wishes to learn. When passing a vacation some years ago in a little village in Normandy, we remember passing frequently the pupils of an English boarding school established in a neighbouring watering-place. These young ladies were invariably talking English when out for their daily promenade, and we fancy they had far fewer opportunities of talking French than we had. If a student is sent to a school abroad, let it be a school entirely under the direction of natives of the country. It is also essential that the pupil should be sent to a place where the pronunciation of the language is pure, and where he has little chance of picking up slangy expressions. We came across a very amusing waiter in a hotel in Vienna. His English had been acquired in London, and he spoke it fairly well, but the lower class Cockney would have recognised him as a brother from his frequent use of the adjective "blooming." Even residence abroad does not absolve the student from the necessity of keeping up systematic study and reading. The more he reads the wider will his vocabulary become, and the keener will be his appreciation of the exact shades of meaning conveyed by the words and phrases he comes across.

Il y aurait de quoi faire bien des heureux avec tout le bonheur qui se perd en ce monde.

Un père, pour dégoûter sa fille du mariage, lui citait ces paroles de Saint Paul: "Celui qui se marie fait bien; celui qui ne se marie pas fait encore mieux." "Mon père," répondit la jeune fille, "faisons bien; fera mieux qui pourra."

Collecteur: "Wollen Sie mir gütigst heute diese kleine Rechnung bezahlen, Herr Schmidt?"

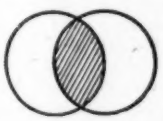
Herr Schmidt: "Ich werde sie am ersten nächsten Monats bezahlen."

Collecteur: "Aber das sagten Sie schon vor sechs Monaten."

Herr Schmidt: "Schon recht, Sie sehen, ich bin nicht der Mann, der heute dies und morgen jenes sagt."

TRANSLATION FROM FOREIGN LANGUAGES.

IT has been well remarked that the test of a good translation is that it is able to awaken in the mind of the reader the same ideas and emotions as are awakened by a reading of the original. Such a standard of translation as this presupposes more than verbal accuracy. The writer who attempted to turn *Paradise Lost* into another language might give an accurate translation both of the narrative and of the poetic imagery, but the stately and majestic swing of Milton's lines would be difficult to render. It would be as difficult for a Frenchman to represent adequately in his own language the simple naturalness and unaffected grace of *The Vicar of Wakefield* as it would be for an Englishman to convey in English an idea of the quaint, old-fashioned elegance of the letters of Paul Louis Courier or the elusive charm of Heine's *Lieder*. But although the ideal in translation may, like all ideals, be necessarily impossible of attainment, it is one which the student who aims at producing a good translation must ever have in view. It may perhaps seem necessary to justify translation as an exercise which should have its proper place in a well-devised course of modern language teaching. The practice of translation may possibly appear to be inconsistent with the view that the student's progress is characterised by an increasing ability to dispense with translation into his own language. No one can really be said to read a foreign language to whom the sentences he reads in the foreign author do not as perfectly represent the ideas they are intended to convey as the English translation would do. Systematic translation from the foreign language is complementary to systematic reading in it. There are many words and phrases in the foreign language whose meaning is not exactly covered by the nearest equivalents we can find to them in the native language. Thus *éclat*, *verve*, *élan*, *essor*, *naïf*, *savoir-faire*, *comme il faut* do not exactly correspond with "brilliancy," "animation," "ardour," "soaring," "artless," "tact," "well-bred," respectively in English; as, in a similar way, *schwärmen* in German does not exactly correspond with "to be enthusiastic over" in English, nor does *Leit-motif* with "characteristic theme," nor *Zeitgeist* with "spirit of the time," whilst in translating *Sturm und Drang* by "storm and stress" we have to assign to the whole phrase a meaning whose application is unfamiliar to the ordinary English reader until specially explained to him. If we represent the extent of the application of the French word *éclat* and of the English word "brilliancy" by circles of equal size, and place one circle upon another so that only portions of their areas coincide, as in the accompanying figure, then the shaded portion which is common to the two circles may be looked upon as representing that portion of meaning which is common to the two words, whilst the portions of the areas not coinciding picture to the eye, on the one side, that portion of the meaning of "brilliancy" not covered by the French word *éclat*, and, on the other side, the portion of the meaning of *éclat* not covered by the English word "brilliancy." The effort to find the nearest English equivalents to such words and phrases as those cited above causes the pupil to have a better grasp of their exact meaning. Generally it may be said that the practice of translating tends to develop the critical faculty, and leads to a better appreciation of the finer shades of difference between words which are apparently synonyms. It cultivates, as few other exercises do, the power of well-balanced and harmonious expression. The most perfect translation is that in which there is a more or less successful endeavour to reproduce the style of the author. The space at our command does not allow us to dwell on this point to the extent we would like, but we strongly recommend our students to study diligently Tolmar's *Art of Translation*, and those who read German should get Cauer's *Die Kunst des Uebersetzens*, on which Tolmar's book is founded. So far, we have been dwelling on the more general aspects of translation, but there are many pitfalls which the beginner need not stumble into if he receives due warning.



We have for some years made a practice of noting down the most typical errors in translation we come across, and of endeavouring to account for them. The chief errors made in translation appear to arise from—

(*a*) *Translating by the ordinary English meaning when a word is used in a different sense in the foreign language.*

Je connais un homme qui est bête autant qu'on peut l'être.—(I know a man *as much like a beast* as it is possible to be.)

La dynastie actuelle est une dynastie étrangère.—(The *actual* dynasty is an irrelevant one.) I have given the whole translation exactly as I came across it, but the translation of *étrangère* is certainly very "irrelevant." *Actuel* in French means "now existing."

Il faut travailler à les corriger.—(It is necessary to *travel* in order to correct them.)

Plusieurs hommes à cheval attendaient.—(Several men *were attending to horses.*)

(*b*) *Translation by English words of foreign words derived from the same root without regard to their suitableness.*

Il tient encore à son Dieu rémunerateur et vengeur.—(He still clings to his *remunerative* and *vengeful* God.)

Les hommes ont besoin de se défendre contre l'arbitraire.—(Men have need to defend themselves against *arbitration.*)

(*c*) *Word-for-word translation.*

Chez les hommes.—(At the homes of men.)

La confiture aux roses.—(Jam on roses.)

Faire une enquête sur place.—(Hold an inquest over the place.)

Vous serez au mieux ensemble.—(You will be at your best in the same time.)

Je n'ai jamais lu la plume à la main.—(I have never read *The Pen in the Hand.*)

La relecture est la pierre de touche du talent.—(The re-perusal is the gem of touch of talent.)

Tout du moins.—(All to the less.)

Aussi l'éloquence politique est-elle toujours incorrecte. (Also political elegance (*sic*) is she always incorrect?)

(*d*) *Confounding words which have some resemblance in spelling in the foreign language.* This kind of mistake is due to imperfect knowledge.

Jamais je ne médite cet épouvantable sujet.—(Never *do I speak ill of* this terrible subject. *Méditer* confounded with *médire.*)

Die Schauer der Vergangenheit.—(The *onlookers* of the past. *Schauer* confounded with *Zuschauer.*)

Tout ce qui ne nous coûte rien ne vaut rien.—(All that which does not *listen* to us *wants* nothing. *Coûter* confounded with *écouter*, and *valoir* with *vouloir.*)

La fortune ne s'acquiert qu'en exploitant les autres.—(Fortune is only acquired by *serving writs on* others. *Exploiter* connected with *exploit* = writ.)

Comme un coupable qui demande grâce.—(Like a *blow* for which pardon is asked. *Coupable* confounded with *coup.*)

La Chine est une sorte d'état amorphe.—(The Chinaman is a kind of amorphous being. *La Chine* confounded with *le Chinois*, and *état* with *être.*)

(*e*) *Using a foreign word in its wrong acceptation when the word is susceptible of several meanings.*

Bien élevé.—(Much raised.)

Ein Passagier im Bauche des Wagens.—(A passenger in the *paunch* of the carriage.)

Un fort honnête homme.—(A *strong* honest man.)

Cette légende est mieux qu'un symbole.—(This legend is better than a *creed.*)

De puiser du moyen de leur langue.—(To take in the *middle* of their *language.*)

En somme.—(In a *burden.* In *sleep.*)

La Esméralda, quand elle entre dans la chambre où elle va recevoir la question.—(Esmeralda, entering the room where she expects to be proposed to.) "To be proposed to" is a very imaginative rendering of *recevoir la question*, which means "to be tortured."

(*f*) *Literal translation of figurative expressions in the foreign language.*

Sur leur trente-et-un.—(Verging on thirty-one years of age.) A familiar expression, meaning "dressed in perfect style."

Als winke Einem die erste Jugend mit ihrer Sonne und ihrer Reichtum.—(As if the first start in life, with its sun and its riches, gave one a friendly nod.)

Les enfants, tirés à deux chevaux, ne savent à qui entendre.—(The children, drawn by two horses, do not know to which to listen.)

A deux doigts de sa perte.—(At two-fifths of its loss.)

The last translation is hardly an example of the literal translation of a metaphor. I give it rather as an example of a brilliant effort of imagination.

Hostile à l'endroit des étrangers.—(Hostile *to the localities* inhabited by strangers.)

Un blâme indirect à mon adresse, I have had variously translated as—Casts a slur on my *skill;* To blame me for my *signature;* An indirect blame to my *skill;* An indirect reproach on my *speech.*

(*g*) *Translation of epithets, etc., in the foreign language by unsuitable words in English.*

J'ai un certain vieux chapeau—rougi et chauve.—(I have a certain old hat—red and *bare-headed.*)

Me goûts dominants.—(My *expressive* tastes.)

Le vieil ormeau.—(The *venerable* young (!) elm.)

L'âpreté des polémiques.—(The *tartness* of disputants.)

Hâtivement enregistrés.—(*Precociously* recorded.)

(*h*) *Translation by English words having some resemblance in spelling to the foreign word.*

Décri ûniversel.—(Universal *decree.*)

Etait intervenu.—(Was *interviewed.*)

Le Président ne pourrait remplacer les ministres loyaux par des ministres factieux.—(The President would not be able to replace loyal ministers by *facetious* ones.)

Fût-ce au bout de plusieurs jours?—(Was this the end of *pleasure* days?)

Dans son état de moribondage.—(In his state of *married bondage.*)

Relève l'être moral à ses propres yeux.—(*Relieves* the moral being *with his own eyes.*)

A propos d'un amoureux.—(When *proposing* love.)

(*i*) *Some translations do not appear to recognise the fact that an author in a foreign language intends to write something sensible.* Many of the mistranslations I have already cited also illustrate this failing. There is not much to be hoped from a student who errs in this way.

Je crois qu'il faut s'abstenir d'apprendre par cœur.—(I believe that it is necessary to be abstemious to learn by heart.)

Lorsque le garçon remit à Coupeau le certificat de mariage.—(Whilst the boy replaced the certificate of marriage in the Coupeau.)

Leur tour vint seulement vers onze heures.—(Their trip lasted only eleven hours.)

Une langue étant donnée, l'ecrivain s'en sert de son mieux.—(A language was given written to complain of our better ones.)

Lors de la rentrée de l'herbage.—(When it is time for the taking in of the pasture.)

Der kleine Gottschack.—(The capital little wag.)

Some students make the mistake of translating an extract sentence by sentence without looking to the linking up of the whole. After translating a paragraph, read the translation through carefully twice—the first time to see that all the ideas in the original are reproduced, and the second time to see that the English is grammatically correct and clear in expression, and that none of the idioms of the original have been unconsciously reproduced. The student should endeavour on this second revision to dismiss the original entirely from his mind, and to criticise his English freely as English.

In order to give students an opportunity of applying the few hints we have given, we offer a prize of half a guinea for the best rendering into English of the following extract. The competition is subject to the usual rules, for which readers are referred to the July number. All translations should be posted not later than 8th October, and addressed *Prize Editor,* Office of the *Practical Teacher,* 35 and 36 Paternoster Row, London, E.C.

Mais est-ce bien la vérité tout entière, que les écrivains pessimistes ont montrée? Même dans l'analyse, l'esprit latin reste absolu, il n'a pas le don du relatif; malgré sa souplesse, il fait volontiers ses personnages tout d'une pièce, il les rend trop conséquents dans le mal ou le bien, il synthétise, il catégorise.....La génie anglo-saxon a beaucoup moins de parti pris; il montre l'homme plus qu'il ne l'analyse, et son respect de l'âme humaine lui interdit d'en découvrir les nudités. Mais s'il a plus de pudeur morale, si ses types restent plus élevés, s'il maintient le *sursum corda* [Lat. "Lift up your hearts." Do not translate.—Ed.] et ne tombe pas dans le pessimisme décourageant, il lui manque cette vaste et large compréhension du cœur de l'homme qui caractérise le génie slave. Ce dernier a tous les courages; dans l'âme d'une courtisane il osera montrer l'éclosion d'une fleur de blancheur et de pureté, et nous verrons l'assassin manifester d'exquises délicatesses de conscience. Aucune contradiction, aucune complexité, ne l'effraie. Les natures les plus tendres et les plus dévouées sont capables, à certaines heures, de pensées dures et violentes; une vie d'abnégation n'empêche pas l'éclosion momentanée d'un criminel désir ou d'une honteuse défaillance. Certes, une tristesse profonde se dégage de cette vue impartiale des grandeurs et des faiblesses humaines, mais l'affirmation que nul être n'est indigne d'être aimé ne dessèche pas le cœur comme la méthode analytique des écrivains latins. La littérature slave ne crée pas le *Hero worship* de la littérature anglaise, mais l'étincelle qu'elle montre brillant dans chaque âme prouve la noblesse des origines de l'homme et empêche de se tarir les sources de l'amour.

MME. DORA MELEGARI.

Study this passage carefully before commencing to translate it. Those whose reading has been fairly wide will be able to see for themselves how far the view of the authoress is generally true by comparing Shakespeare's presentation of Hamlet, Othello, Portia, Cordelia, etc., with the priests, women, and men of business of Balzac, or the characters of Paul Bourget or Edouard Rod on the one hand, and with the characters of the Maslova of Tolstoy's *Resurrection,* or the Raskolnikoff and the Sonia of Dostojeffsky's *Sin and Expiation* on the other hand.

ON READING A FOREIGN AUTHOR.

WHEN should we commence to read an author in the language we are studying? What should we read? What plan should we pursue in order to derive the greatest possible profit from our reading? What proportion of the time we give to language study should be devoted to reading? These are important questions, on the thoughtful consideration given to which depends to a large extent the solidity of the progress we shall make in our study of modern languages.

One of the greatest faults generally committed in the teaching of modern languages is to give too large a proportion of time in the early stages to the formal teaching of grammar, and too little to reading. We should act on precisely the opposite plan. We do not commence the teaching of English grammar until the pupil is sufficiently acquainted with his mother tongue to be able, under his teacher's guidance, to compare and contrast the usages of the words he employs, and so to comprehend grammatical distinctions. Like M. Jourdain in Molière's comedy, who had been talking prose for many years without knowing it, the child has been using subjects and predicates, nouns and verbs, long before he is brought to see the distinctions between them. We do not mean to say that deductive and analytic methods can be as largely employed in teaching the grammar of a foreign language as in teaching the grammar of our own tongue, but we know from actual experience that a pupil can be made by intelligent reading of a foreign author to discover many grammatical rules for himself, and that what he thus discovers becomes to him a more permanent and real possession than if he had merely committed to memory the rule as stated dogmatically in a text-book of grammar.

As an essential preliminary to commencing the study of a foreign language, a student must have an absolutely clear conception of the fundamental elements of universal grammar,

which can be taught in connection with his own tongue. He must have exact ideas on the nature of a sentence and of its chief and subordinate divisions. He must also clearly grasp the nature and use of each part of speech, and the part it plays in the building up of a sentence. He must have assimilated the distinctions of number, gender, case, and person in nouns and pronouns, and those of voice, mood, tense, number, and person in verbs. He must understand the concord of nominative and verb, and must above everything understand the use of the infinitive mood and participles in the formation of compound verbal forms. This is a point which English teachers too often neglect. The pupil is taught, for instance, to parse such a combination as *shall be given* together, but never to take each verbal form and parse it separately. If his English grammar is to be used, as it ought to be used, as the point of departure for the study of the grammar of a foreign tongue, it is of prime importance that the pupil should be able to parse fully each part of such a verbal combination as the one given above, and of absolutely secondary importance that he should know what to say of the combination when taken as a whole. We have met with many cases where bad teaching in this particular part of English grammar has led to the pupil encountering very great difficulties with French and German verbs. On the question of the use of the grammar of the mother tongue as a basis for the teaching of other languages, Professor Waldeck's *Praktische Anleitung zum Unterricht in den lateinischen Grammatik nach den neuen Lehrplänen* (Waisenhaus, Halle) should be read and pondered over. It is a most valuable book, of which, unfortunately, there exists as yet no English translation.

Presuming the pupil to possess the equipment suggested in the preceding paragraph, we have next to consider at what stage in his progress he should commence to read in the foreign language. In French he may commence as soon as he has learned the chief rules as to the plurals of nouns and adjectives, the normal method of forming the feminine of adjectives with the commonest exceptions to it, the terminations of the regular verbs, the verb used negatively, reflexively, interrogatively, and combinations of these uses, and the parts of the most commonly recurring irregular verbs. In German he should understand also the rule which places the finite verb at the end in a subordinate sentence, and the rule which requires the inversion of the nominative and verb in the principal sentence when it is preceded by the subordinate sentence.

The kind of work which it is advisable to put first into the hands of a student will depend partly upon his age. Naturally we should commence with something the style of which is easy. Books of extracts from authors should be avoided until the student is somewhat mature in his power of reading. Even then their utility is perhaps open to question. In the early stages they should be entirely avoided. The variety of styles which one comes across in such compilations might do little harm to a mature student, but the study of style in an author is best fostered by reading entire works. While it is very unlikely that all students of a modern language will pursue their studies in it to the point of being able to write as well as to speak in it with ease and some approach to elegance, this is an ideal which should always be kept in view. As far as possible, the student should, until he acquires some critical power in the language he is studying, read only works which will lead him to an appreciation of style. When he has made some advance in the power of reading, collections of extracts may be of use to him in directing his attention to authors he has not yet read.

We recommend, then, that continuous works should be read from the beginning—works which are interesting in themselves, and which will therefore supply the student with a powerful motive for pushing on his studies, and which possess some charms of style. In another part of this number we sketch out a graduated course of reading in French. The amount of work which devolves on the student at this stage of his progress will differ according as he is working alone or with a teacher. One of his chief difficulties will be the number of new words he comes across. The serious difficulty that he is to encounter if working alone is the amount of hunting in the dictionary which this will involve, and the fact that he will often be called on to decide which of the several meanings given in a dictionary to a certain word is the one which is correct in the particular instance. If he has a teacher, these difficulties can soon be solved; but whether he has a teacher or not, there exist at the present day many editions of works suited for beginners and furnished with full vocabularies in which only the meanings wanted are noted. This is an arrangement which not only lessens the student's labour, but permits him to build up his knowledge of a foreign language in a way similar to that in which he acquires a complete comprehension of his own.

The student's work will be only half done if he merely looks up the word he wants. He should keep a notebook for each work he reads. In this all new words should be recorded. Remembering that his ultimate aim is not merely to recognise the foreign word or expression when he sees it again, he will in noting down the word try to create some associations with it which will ensure his using it properly. For instance, he will not write down in his book "*fenêtre* (*n.f.*), window," but "*la fenêtre*, the window," thus creating an association between the noun and its article which will effectually prevent his mistaking its gender in future. Thus he will write, "*l'homme*, the man;" "*le héros*, the hero;" "*le onzième régiment*, the 11th regiment." When he comes across the verb *devenir*, he will not write down "*devenir* (*-venant, -venu*), to become," but "*Il va devenir riche; en devenant riche; il est devenu riche*," which will at one and the same time fix in his mind the knowledge of the parts of the verb, and also the fact that it forms its compound tenses with *être*. Similarly with the position of adjectives. He will not merely write *fou* and *intéressant*, with their meanings, in his notebook, but will combine them with nouns—for example, *un fou rire*, *un livre intéressant*. When he notices that certain conjunctions govern the subjunctive, perhaps with *ne*, he will write in his notebook short examples illustrating their use. Accordingly he must not write "*avant que* (conj. gov. subj.) = before," but "*avant qu'il parte*, before he goes away." So with *de peur que*, etc., he might write "*de peur qu'il ne tombe*, for fear that he falls." This method can be extended still further to fix indelibly on the mind the relative positions of the dative and accusative pronouns and of *en* and *y*. With phrases, too, the phrase must be incorporated in a suitable sentence. The student should not write in his notebook "*à vrai dire* = to speak truly," but a sentence, as, "*Il n'a pas, à vrai dire, beaucoup de talent.*" A similar method should be employed for other foreign languages. The notebook should be preserved, as it can be used in revising the author. The student will, of course, as he goes on, find himself becoming more and more independent of this and of the dictionary.

It is rather difficult to lay down the exact proportion of the whole time given to the study of a language which should be devoted to reading. If we exclude time given to conversation, about two-thirds of the remaining time should be given to reading. The student who ceases to read does not merely cease to make progress in the language he is studying, but he retrogrades. However little time in the bustle of life one can give to study, a small portion of our leisure should be devoted to increasing our knowledge of the literature of the languages we have acquired. There is no finality in language study. A living language is in a state of continual but slow change in its vocabulary and in its modes of expression. It is only by constant reading that we can bring up to date the knowledge we have already acquired.

On disait à un auteur tragique qui n'était pas heureux: "Pourquoi ne faites-vous pas de comédies?" "Je ne fais pas de comédies depuis que j'ai lu Molière." "Il paraît," lui dit-on, "que vous n'avez jamais lu Racine."

Sohn: "Vater, warum heisst's denn in der Geographie immer europäisches Festland?"

Vater: "Dummer Bub', liest du denn nicht alleweil in der Zeitung: Schützenfest, Sängerfest, Turnerfest, Künstlerfest, Kellerfest, u. s. w."

HOLIDAY FRENCH AND GERMAN.

BY A MAN WHO KNOWS NEITHER LANGUAGE.

THE contents of the September number of the *Practical Teacher* will be profoundly depressing to many of its older readers, who did not enjoy the advantages of an early training in foreign tongues according to the new and rational methods therein to be set forth. And yet many of these old stagers would fain enjoy the pleasures of a holiday abroad, were it not for the terrors of the language which they were never taught. They know quite well that the grammar is now for ever beyond their reach, failing some special miracle taking place among the cells of their brain. In the probable absence of the requisite miracle, some comfort may be drawn by such uneducated ones from the personal experience of one of themselves.

The general thesis to be here defended is that a man, or for that matter a woman, may speak French and German with fair fluency, and be perfectly able to understand these tongues when heard, without having been taught either, and without any grammatical knowledge worth the mentioning. Indeed, so far as the writer's observation goes, knowledge of the grammar is an acquirement which often hampers conversation and renders it unintelligible to the foreigner. That is the chief effect which he has noticed in the conversation of his more perfectly educated companions. Perhaps those foreigners were not grammatical persons.

It may as well be confessed at once that the writer—that is *me*, so the usual pronoun may be used henceforward to save space and trouble—well, I confess that I did spend or misspend some time at school in the study of French, so called, under a worthy man who knew none of it, but had an ambition that I should do so; and further, that I actually had the temerity to include the same alleged French among the "subjects" of my Training College course. Still I think I may fairly claim to be absolutely ignorant of all that is entitled to be called French grammar. I am aware, of course, that French nouns, and probably some other parts of speech, have two genders, but I never can tell which of those two genders is appropriate to any particular word. This lessens the value of my knowledge of French genders considerably from the point of view of such as write in the *Practical Teacher* on Modern Languages, but it is a source of much comfort to myself. If I speak badly enough, which I generally do, it is impossible for a listener to decide which gender I intend my noun to have; and if he is the right sort of man, he will give me the benefit of the doubt. A Frenchman is sure to do so. My friends who know all about gender, and would rather keep silent for a day than use a wrong termination, are so very particular to make their accuracy known that no one outside their immediate circle of friends can tell what they began to say by the time that they have got to the end of it.

It is just the same with the irregular verbs. There are people who consider these more difficult to use than the regular ones. Under my treatment the most regular of French verbs acquire sufficient irregularity to purge them of all pride over their fellows, while a judicious pruning of the ornamental and useless parts of the irregulars reduces them to a fairly workable size and shape.

Next to the grammar, the greatest hindrance to the fluent use of French I find to be the dictionary. A kind and far-seeing friend warned me against its dangers early in my professional life, and for that I owe him sincere gratitude. A few French translations of Scott's novels and Shakespeare's plays soon put me into the happy position of being able to sell my dictionary—a crime which, in the interests of the possible buyer, I did not commit. In this way a habit of reading and speaking and thinking in phrases rather than in words was acquired which I have found of much practical value. Of course in an examination it would be a delusion and a snare. But this is a holiday paper.

Equipped with this slender knowledge and extensive ignorance of French, it will be readily believed that I found myself among French-speaking people for the first time with fear and trembling. For a day and a half I was as one born deaf, who had also progressed far on the way towards dumbness. Then in the apparent babel of sounds I began to perceive words dimly, and well known phrases began to detach themselves from the background. At the same time my tongue was loosed, and it became easy to chatter to my gay and polite companions. They knew what I meant to say better than I did myself, and they did not seem to think it very funny that a foreigner should make grammatical errors in speaking their tongue. I suppose it must be a proof of our keener sense of humour that we think a Frenchman's blunders in English a cause for laughter, but there are times when a little more politeness might lead us to postpone the open enjoyment of this type of joke.

The late Professor Blackie used to say that when he spoke French he always felt like a monkey. On this matter I am not able to pronounce an opinion, as I do not know how a monkey feels, but there is one monkey trait which is of undoubted use in the speaking of French and of every other language; I refer to close imitation. To imitate their tones and accents, even their peculiarities, as they may seem to us, is the surest way to be intelligible to any people among whom we may find (or lose) ourselves. But this is not always easy to do, and one cannot always conceal the fact that he is a foreigner, though he may easily conceal his nationality. In one French town, during my first Continental tour, for example, I was taken for a Swiss, though in the company of English friends. When I asked them why this should be so, I was told that it was on account of the Swiss speaking French so badly. This kept me from feeling proud of my accent. But I scored next day when my friends failed to make the booking clerk at the railway station understand them when they asked for a ticket to the second station along the line. He assured them there was no station of the name they gave on the system. When I asked for tickets to the same place he gave them without remark. But then my friends were French scholars and I was not; and in many cases I have found that to make a difference.

As regards German, my experience has been somewhat similar. My first acquaintance with that tongue was made, not in school, but in church. I find it a very good way of gaining some familiarity with a new language to use in church a Bible in that tongue. There are some, no doubt, who might have conscientious or other objections to this mode of language study. It has obvious disadvantages to those who never go to church, for instance. But being in church one finds certain compensations in it. It makes a long sermon not intolerable, and gives a sense of time well spent. To some persons this will be a decided novelty.

I next proceeded to practise conversation with a young German for a couple of hours weekly. After a month of this I felt ready to go to the Fatherland, the more so as two of my travelling companions had a competent knowledge of the German grammar. My own knowledge of that grammar was drawn chiefly from Mark Twain's able essay on the subject, which I cordially recommend to all who, like myself, have no intention of studying its intricacies.

The result was what might have been predicted, assuming my theory to be correct. From the very beginning of our tour I had to act as interpreter, and if the remuneration of my work had been at all commensurate with its success, I should have stuck to that business. But one rarely gets what one deserves in this world, which is one reason for its being so good a world on the whole. One word must be said in explanation. I was the only one of the party who smoked a pipe. The bearing of this explanation may not be evident at first. Its true inwardness lies in the fact that speaking with a pipe in one's mouth vastly improves the purity of one's German. I do not mean that it improves the grammar, but it certainly throws a discreet veil over some of its most striking peculiarities, and the result is a speech which is easily "understanded of the people."

During the tour referred to I came across only one man whom I could not make understand my German. He was a ferryman who carried us over the Neckar one day in the Black Forest. I was much mortified at the incident until I learned at the neighbouring village that the man was stone deaf. After that I was able to enjoy the lunch which we had crossed the river to obtain.

I have mentioned the pipe as the best aid to a correct and intelligible German style; possibly a big cigar might be a

pretty good substitute, and failing both I should recommend a moustache long enough to gnaw at the necessary intervals without very serious injury or permanent deterioration. I regret that no equivalent prescription occurs to me which might be suitable for ladies, for even the cigarette does not possess body enough to conceal a really thorough ignorance of grammatical usages. For them I fear the only plan is to study the language in accordance with the numerous and excellent hints which I doubt not the Foreign Language number of this popular periodical will offer.

I dedicate these remarks to the elderly and imperfectly educated who, like myself, suffer under the mistakes of the teachers of their youth, in order to convince some of them that having been born half a generation too soon is no real bar to their taking a thoroughly good holiday abroad without the indignity of joining a "personally conducted" troop. If I should confirm one doubter on this point my confessions will not have been made in vain.

INTERNATIONAL CORRESPONDENCE AS AN AID IN THE TEACHING OF LANGUAGES.

ITS ORIGIN AND DEVELOPMENT.

Scene I.—A country school in a French town, situated not far from the Alps. Time, about the year 1894. *Teacher*: "I wonder what I can do to interest these children in their study of English; they hate it so, and think it such a dry lesson. I think I shall try to get some English boys and girls to write to them. They are sure to think it fun to get some letters from England."

Scene II.—A governess in a remote English country house. "What shall I do? Henry and Ethel dislike their French lesson, and it is so difficult to rouse any interest in it. I wish they knew some French children to talk or to write to."

Scene III.—November 1896. Two London editors, each in his own private room, reading a letter from France. "Well, this letter wants looking into; the writer seems a good practical man, and his plan a very good one. I must think what can be done."

It was in some such way that the scheme for an international exchange of letters first originated. Needless to say, the French professor was M. Mieille, now at Tarbes, whilst the editors were respectively Mr. Scheurmier of the *Practical Teacher* and Mr. Stead of the *Review of Reviews*. M. Mieille wrote that one important part of the plan would be, that in every school each boy or girl in correspondence should receive a letter from totally different parts of the country, thus giving more variety; whilst so far as possible the social conditions of the students, their age, and their standing in the school should be studied. In 1897 the plan was first simultaneously given out by the two magazines named above, and by the *Revue Universitaire* and *Le Volume* in France. The means of working the plan has been simplicity itself. Names were collected in France, sent over to England, paired with those collected in England, returned to France, and published there; the writers of the first letters being French or German, as the case might be, for Professor Hartmann of Leipzig started the German bureau in March 1897. From these beginnings there has been a wonderful development, though strange and unforseen have been the difficulties. Teachers in England at first were generally averse to the plan, thinking it was scarcely safe to let boys and girls of different countries chatter together. Their fears have proved groundless. With one or two exceptions the letters have been unobjectionable; results, however, always being in accordance with the degree of enthusiasm in the teachers. English girls were very much amused with such letters as the following:—"In my imagination I am seeing you there in your room reading this letter. You are blonde, of course, for English girls are mostly fair. Then your eyes are light blue, *n'est ce pas?* You have, as I, *une tresse pendante;* but perhaps I am much wrong, so I shall be happy to receive your portrait." Whilst the French boy quite expected that his English letter would concern games, and eagerly asked questions about cricket and football. From this correspondence an exchange of visits often followed; here, however, is a large "but." The correspondents belong chiefly to the class which has not a large amount of money to spend; so if the correspondent lived the one in Kent or Sussex, the other in the Pas de Calais or the Nord, the difficulties were small; but if one were in Aberdeen and the other in Toulouse, an exchange of visits would be very unlikely to take place. Hence bureaus have been established in France, Germany, and London, where applications are received, which must be sent through teachers or parents, and accompanied by references. These bureaus are:—London: *Review of Reviews*, Mowbray House, Norfolk Street, Strand. Paris: M. Toni-Mathieu, 36 Boulevard Magenta; and *Quatre Langues*, 63 Boulevard St. Germaine. Berlin: Herr Hempfler, 13 Belforterstrasse.

The correspondence has shown some other curious developments. Boys from one colony have asked to be put in correspondence with those of another, or the home country. Sometimes at the request of parents or teachers a boy has been put in correspondence with a girl, and those teachers who approve declare that there is a charm in this. It calls out the best qualities on both sides: girls being usually the best letter writers, the boys have been influenced to do their best. As concerns ourselves, the exchange of letters has generally been with France. Comparatively few students in England learn German, but between France and Germany an enormous correspondence has taken place, and the naïve observation of one French boy, that "after an exchange of letters he was induced in consequence to visit Germany, because he found his comrade to be not quite an ogre," very plainly showed that these letters are powerful in other ways than the purely educational. Progress in the future will follow in two ways. 1. We must promote as far as possible exchange of visits between students who intend to become teachers of modern languages, and here the requests from France are much more numerous than those from England. 2. That in consequence of the co-operation of the Modern Language Association, an international list of teachers will be prepared—such teachers to be those who have already co-operated in the scholars' correspondence, or are anxious to do so. By the publication of these lists teachers can at once be put in touch without intermediary, thus saving time and making possible the pairing of children with better regard to their social circumstances—this, of course, being very difficult in the original simple plan, for I might, for example, have a boy the son of a doctor, age fourteen, and the only available boy of the same age might be the son of a labourer; the social conditions being so different, the best results could hardly be hoped for. The question teachers will ask is, How far does the exchange of letters help in the acquirement of languages? The best answer to this will be to quote from Mr. Buhrer's speech at a meeting in 1902 of the Scottish Modern Language Association, and by the fact that few teachers who commenced have given up the plan, and that other teachers continually come forward to try it, and after doing so send in more names.

Mr. Buhrer said that in connection with the Perth Academy, when he was first asked in the spring of 1897 to join in the movement, he hesitated, but after receiving the first report from Professor Hartmann, he brought the matter before his pupils in the advanced classes, and almost all the girls took it up. That was at the end of 1897. Ever since the girls in the highest classes have been members of the International Correspondence Classes. During the last few months he had had the pleasure of sending in twenty-one names of adult students who attended the evening continuation classes. Altogether there had been sent in about ninety names and addresses since November 1897. Of those who took up the correspondence from the beginning he was glad to say that he only knew of four who had dropped. The others were still keeping it up, and he thought were as much interested in it as ever. What were the aims of international correspondence? To promote education, instruction, and friendship; and the benefits derived from this system were numerous indeed. Comparatively few of the many lovers and students of modern languages were able to go to

Germany or France, and the next best thing, he thought, to actual residence abroad was this correspondence. Here the correspondent had an opportunity of bringing his knowledge into practice, here he found a direct connection with one who spoke and wrote the language, and here he got a regular intercourse and discussion of things up to date. Facts about certain customs and manners which he never could understand from his book, and which seemed strange and incomprehensible, were explained, and he penetrated into the culture and the spirit of another people. If both partners were serious in their correspondence they would vie with each other in bringing out the good points, not only of their school, but of their town and their country, and thus the correspondence becomes not only a propaganda of their language, but also of their country. The correspondence helped to make the study of language in schools less dry and monotonous and less of a drudgery. Pupils always looked forward to their next letter. They learned a good many words they never got from books nor heard in the class. If they intended going abroad they would know to whom to apply, and would get information and help from their friend; while on arriving they would feel themselves less lonely, knowing they had at least one friend to turn to in any difficulties.

The correspondence, however, did not only go on during the school tenure, but during the holidays and after the pupils had left school, and led to friendships and business relations, and was a real source of pleasure and profit to all those who were thus engaged.

Proceeding, Mr. Buhrer said it was precisely because of the crowded condition of the class work that this system afforded a relief instead of giving an added burden to bear. No time whatever need be occupied with the correspondence in class hours, but the students should carry it on themselves. An occasional letter of special interest or amusing errors might be read in the class. He could say from personal experience that correspondence did not burden the teacher, but made his work much lighter and more interesting.

I do not think I need add to Mr. Buhrer's words beyond saying, "Try for yourself, and if you give up in disgust it will surely be because—" Well, it would not be polite to finish the sentence.

E. A. LAWRENCE.

THE APPLICATION OF PHONETICS TO MODERN LANGUAGE TEACHING.

BY B. DUMVILLE, B.A., L.C.P.

THE first thing to do in commencing the study of a *spoken* language is to learn to recognise and produce all the sounds *correctly*. By this it is not meant that we are to take one of the ordinary grammar books and study the introductory remarks on pronunciation in which each sound is said to be like some one of the English sounds. True, it is *possible* to introduce our English sounds, and to make ourselves understood by an *intelligent* foreigner, especially if the latter knows fairly well beforehand what we are going to say. But if we are anxious to speak and read the language with any satisfaction both to ourselves and to the foreigner, we must *begin* by recognising that there are important differences in most of the sounds, both vowel and consonant. To allow a boy at school to take a pen for the first time, hold it in whichever way he pleases, and use it for weeks, months, and years, until he arrives at such a stage that he can write legibly, and *then* start to correct his acquired bad habits of holding the pen, is no more foolish than the old method of teaching a spoken language, according to which people commence to "polish up" their pronunciation when they have thoroughly fixed all the sounds, which have to be corrected.

If the *first* few weeks are given up to exercises on all the new sounds, and if during the first few months *every word* is spoken with great care, and corrected and recorrected until it is absolutely satisfactory, much time will be saved in the long-run. The correct speaking of a language will require an immense amount of practice, and this should be put in incidentally with the learning of the words. By doing nearly everything orally at the beginning, we are not only acquiring a good pronunciation, but we are laying a firmer foundation in memory. Though individuals differ somewhat, it is nevertheless true that the ear memory is in nearly every case more important than that of the eye. The advanced student of a language usually "feels" that a phrase is wrong by hearing it more correctly than by seeing it written.

In the early stages it is practically impossible to do without a competent teacher to explain the vocal mechanism for each sound, and to correct the first attempts. To supplement this instruction, and to fix it, a good elementary book on the phonetics of the language should be studied.[1] Most experts on phonetics are in favour of the use of a special set of symbols, different in many cases from the ordinary ones used. The reason of this is, that the ordinary letters invariably suggest, by association, sounds given them in the native tongue of the learner. Try as he will, he cannot completely rid himself of this tendency. By giving him a symbol which has no suggestive power of this kind, we free him from the bondage of the associations he has already formed. If he complains about the labour of acquiring a new set of symbols, he is quite ignorant of the seriousness of the task before him. The acquirement of a new set of sounds, to be able to pronounce them with any ease, is not the affair of days but of *months*. And if, by adopting a few new symbols, the difficult task can be made lighter, the intelligent learner will welcome the innovation.

The symbols most commonly adopted are those of the *Association Phonétique Internationale*. For French they are as follows:—

Symbol.	Word containing Sound.	Symbol.	Word containing Sound.	Symbol.	Word containing Sound.
j	pied, lieu	ɥ	lui, huit	w	oui, moi (mwa)
i	lit, cri	y	tu, mur	u	ou, nous
e	été, donner	ø	peu, jeu	o	nôtre, beau
ɛ	père, aile, elle	ə	le, me, je	ɔ	colline, coq
a	patte, matin	œ	neuf, sœur	ɑ	pâte, tasse

The *nasal vowels* are:—

ɑ̃ as in tante, ample, tente, temple.
ɔ̃ ,, on, ombre.
ɛ̃ ,, fin, timbre, craindre, faim, feindre, syntaxe, nymphe.
œ̃ ,, un, humble.

The sounds j, ɥ, and w are really very *close*, and shortened forms of the vowels beneath them (i, y, and u respectively). So close are they that they may be classed as *consonants*, since the air-friction sounds produced are such a striking feature.

For the other consonants we use the same signs as in ordinary French, except in the case of—

ʒ* which represents *j* or *soft g*, as in je, rouge.
ʃ† ,, ,, *soft ch* ,, chien, chambre.
ɲ‡ ,, ,, *gn* ,, agneau, seigneur.
ʁ ,, ,, *hard ch* or *hard c*, as in orchestre, coq.

The following are examples of phonetic notation:—

Les deux agneaux mangent l'herbe du jardin
lə dø zaɲo mɑ̃:ʒ§ lɛrb dy ʒardɛ̃

Le paysan et la paysanne cueillent les cerises
lə peizɑ̃ e la peizan kœj le sriz

Les Etats-Unis d' Amérique
lez etaz yni d amerik

Guillaume premier, roi d Angleterre
gijo:m prəmje rwa d ɑ̃gləte:r

[1] Several small books exist. *Elements of French Pronunciation and Diction* will be shortly published.

* *J* and *g* have already been taken to represent other sounds.

† This sound (the unvoiced form of ʒ) is *one* consonant only and not two, as ch would imply.

‡ This is *one* sound, intermediate between English n and *ng*. It must be distinguished from *ni*, as in opinion (opinjɔ̃). The writer had occasion, only a short time ago, to correct the pronunciation of *gn* in the case of a French —master in a Lycée. This gentleman, all his life, had been giving nj for ɲ. Fortunately, another highly-educated Frenchman was available to support the writer's correction, or our good friend would never have believed it possible for an Englishman to correct him.

§ The sign : indicates extra length.

The limits of this article prevent the explanation of the exact characteristics of each of the French sounds. We may here call attention to *one* of the features of the system. Take the French nasals *ã*, *õ*, *ẽ*, *œ̃*. The sign ~ indicates that *some* of the air must pass through the nose. There is thus a composite sound consisting of the ordinary *mouth* vowel indicated by the letter **a**, ɔ, ɛ, or œ, combined with the peculiar nasal resonance. There is no *m*, *n*, or *ng* in the sound, in spite of the fact that an *n* or *m* is always written in the French. By using such symbols we call attention to the *true* nature of these sounds, and the association with a nasal *consonant* as *n* or *m* is broken.

The symbols need not be used longer than they are found necessary. They can be discarded when the new sounds are firmly fixed. It is found, moreover, that they actually help the ordinary spelling, by systematising the various methods of representing each sound.

It is worse than foolish to ridicule such a system *without trying it*. *No one* who has intelligently used it has found it of little value. The best reply that can be given to the criticism of the uninitiated is—*Study and practise it.*

When the student has acquired fair power over the sounds from a competent instructor, he can do much by himself with a phonograph and French records. But it is not advisable to utilise these *at first*. The sounds cannot be acquired by hearing only. When once they have been fixed, delicate inflexion and accentuation of French can be added to the good pronunciation by imitation of the rendering of educated French people. We cannot have such at our beck and call, nor would they be patient enough to repeat often enough to enable us to imitate exactly. Records on the phonograph will serve the purpose far better than the makers of them.

ACCENT AND LIAISON.

BY GEORGE COLLAR, B.A., B.SC.,

Editor of De Maistre's "Voyage autour de ma Chambre," and About's "Le Roi des Montagnes" (*Nelson and Sons*).

THE Frenchman who studies English meets with two difficulties which his own language does not offer to the English student. The first is the position of the accented syllable, and the next is the want of a system for dividing a word into syllables. Even with the same spelling the accentuation of the word may vary. Thus we have prodùce (verb) and pròduce (noun), confèssor (a person who confesses his sins) and còn fessor (a priest who hears confessions). We have absolutely no rule for the position of the accent either with respect to the order of syllables in the word or with regard to derivation. Thus, in the words given above, the accent falls sometimes on the prefix, sometimes on the root syllable, while in quotàtion, etc., it falls on the vowel which merely connects root with suffix. The stress laid on the accented syllable is so great that to place it elsewhere is a very serious fault. In French, however, the syllables of a word have all nearly the same value, unless they are altogether mute. A slight exception is to be made in the case of the syllable that had the tonic accent in Latin. The persistence of the tonic accent is highly interesting for students of etymology, but the ordinary student need not trouble about the accented syllable in Latin, but remember that in modern French **the tonic accent falls on the last syllable of the word unless that syllable is mute, and then the accent falls on the last but one**—étran*ger*, ad*met*tre.

It frequently happens that, owing to some grammatical change, the last syllable but one would be mute, as well as the last: for example, if we formed the feminine of *étranger* according to the general rule, we should have *étrangere;* but *é-tran-ge-re* ends with a mute syllable, and consequently the last but one must take the stress. But as it is impossible to put a stress on the mute syllable *ge*, we alter it to *gè*, and make it capable of taking the stress. This principle is the key to many apparent irregularities in French grammar, and is also one of the many proofs that in learning a language the ear is more important than the eye. No student who remembers this simple rule for the accent, and who pronounces his words, or thinks of their pronunciation when he writes them, will ever make a mistake over the spelling of such words as—

(*a*) Feminines—*fermière, écolière, nette, complète;* (*b*) verbal forms—(*jeter*), *je jette;* (*se promener*), *je me promène;* (*recevoir*), *ils reçoivent, que je reçoive;* (*précéder*), *je précède.*

Notice that in the case of such verbs as the last even the syllable *cé* is not capable of taking the full tonic accent, so it is changed into *cè* to make it more sonorous.

The rule for dividing a word into syllables is simplicity itself. *Keep every consonant as late as possible.* Never put a consonant into the first syllable if you can put it into the second, etc. This rule is invariable: no matter how the word may have been formed, the division into syllables depends solely upon its present spelling. If we take, for instance, the two English words *inconstant* and *inaccessible*, the first syllable in each case is *in;* but the words similarly spelt in French are thus divided—*in-con-stant* and *i-nac-ces-si-ble*—the first syllable of the first being a nasal sound, while the first syllable of the second is a pure vowel.

This rule for division of syllables is so important that it takes effect to such an extent as to lead to the carrying on of a consonant to the next word should the latter begin with a vowel. English students often make the mistake of ending a line with *l'* or *qu'*. This is wrong, because the *l'* or *qu'* forms part of the following syllable, and should not be separated from it; for in French, as in English, a syllable should never be written partly on one line and partly on another.

The habit of carrying on the final consonant of a word is one that requires considerable practice to acquire; and perhaps French people, in speaking their own language, make more mistakes in this respect than in any other. There are two forms of error in this matter—one in which, by omitting the consonant, two vowel sounds come together which shock the ear. This is called *cuir* (leather), from the harsh effect produced. The other consists in putting a needless consonant between two vowels which should come together, and this production of too much softness is called *velours* (velvet), as in *quatre-s-yeux* for *quatre yeux.*

Those grammarians who explain every difficulty by saying that it is "for euphony," tell us that two vowels cannot come together—a most absurd statement, as a glance at any French book will show. But it requires a well-trained ear to tell when two vowel sounds should come together and when they should not. Uneducated people often avoid the liaison to conceal their ignorance of grammar. In *La Grammaire*, M. Caboussat, who is weak in spelling and grammar, says:—"Lorsque je parle, ça va très bien, ça ne se voit pas—j'évite les liaisons. A la campagne, c'est prétentieux, je dis: 'Je suis allé.' (*Il prononce sans lier l's avec l'a.*)"

We advise our readers to practise reading aloud in French, dividing the words into syllables and making the liaison wherever possible. This is so simple that children in French schools get over the mechanical part of learning to read in a year or so.

We should remark that the consonant that is carried on must not be exaggerated, and its articulation may even be a little more feeble than if it occurs at the beginning or in the body of a word.

Certain words beginning with a vowel do not admit of a liaison, such as *onze, onzième,* and *oui.* Thus we say, "*Il est | onze heures. Mon frère est | onzième. Je dis | oui.*" Some speakers make no liaison with *ouate,* cotton wool. Englishmen are tempted to omit it in such words as *oiseau,* on account of the resemblance of the first sound to our *w;* but this is wrong—we must say *les oiseaux.* Although the word "aspirate" means "rough breathing," there is never a rough breathing in an aspirated *h* in French. The only difference between the *h* aspirate and the *h* mute in French is that the former prevents the liaison, while the latter allows it. In English, it is easy to remember the few initial *h's* that are mute; but in French, mutes and aspirates so nearly equal one another in number that even experienced French speakers find a difficulty in this matter. A favourite question in examinations is, "Give the feminine of *le héros;*" and the student, who knows that the feminine of *héros* is *héroïne,* writes down *la héroïne,* which is wrong—for although the *h* in *héros* is aspirate, in all its compounds it is mute. The

initial in *huit* and *huitième* is aspirate—*Je suis le huitième*—but yet, in the compound *dix-huit* it is mute (*di-zuit*).

Some consonants require a special remark.

C. In spite of the rule that *c* is soft before *e* and *i*, this letter always takes the *k* sound when carried on to the next word—*Ce tabac est très bon.*

In the names of the coins *franc* and *marc*, the *c* is never carried on.

D. This is carried on as a *t*—*Quand on est jeune.* [Quan-t-on est.] After *r*, the *d* is seldom carried on at all—for example, *bord, égard, hasard, lourd, nord,* and *sourd;* and should not be carried on in *nid* or *nœud.*

G is generally sounded as *k*—*un rang élevé.* It keeps the sound of *g*, however, in *joug.*

M, N, P, R, are not carried on unless they are pronounced when the word stands alone.

There are a few exceptions to this—for example, we say *on a*, pronouncing it almost exactly as in *on n'a pas;* so *j'en ai assez, en hommage, ancien élève, bon à rien, rien à faire.* So also *J'ai beaucoup à faire;* and the final *r* of the infinitive in the first conjugation should be carried on—for example, *aller et retour*, although many people, in asking for a return ticket, say, "*allé et retour.*" This is a great trial for Englishmen, who become familiar with the isolated use of the infinitive in learning their grammar, and in this case the final *r* is not sounded.

T is generally carried forward unless it is preceded by *r*—*il concourt | à l'Exposition.* It is always carried on in *est*, but never in *et.* This marks a difference between the verb and the conjunction.

X is carried forward as a *z* sound in words in which it is sounded as *ss*, or not sounded at all—*six ou dix arbres.* In other cases it keeps its compound sound *ks.*

METHOD IN RELATION TO TIME.

OF late years great attention has been paid to methods of teaching modern languages, and many systems have been evolved—all agree more or less in adopting a *direct* method. There is a great danger, however, when deciding which method to adopt, of disregarding such circumstances as the age of the pupils and the amount of time at their disposal.

Some teachers hold that the pupil should learn the foreign language exactly as he learnt his own. They forget the fact that most English boys and girls who begin to learn French or German have already acquired a considerable amount of linguistic power in learning their own language; and even if they have not done much in the way of formal grammar, they have some general ideas on the subject which they have gained by practice. Then, again, when a child is learning his native tongue he hears it spoken all around him, and lives, as it were, in an atmosphere of it. This condition of things teachers try to reproduce by using only French or German in the lesson. This is excellent as far as it goes, and teachers who adopt the method keep making demands (and very properly too) for a larger share of the school hours, and frequently when questioned about the possibility of teaching a language with only one or even two hours a week, they say that if more time cannot be devoted it is not worth while to take up the subject.

Now it seems to us that the method to be adopted in teaching a language must depend very largely on the time at the teacher's disposal. Of course, if the whole of the pupil's time can be given to the study of the language, the best thing to do is to send him into the country where he will find it the sole medium of expressing his thoughts—in the home, the street, the shop, and the school. If he can stay there long enough, he might have quite a liberal education in it and through it. If the pupil can give about eight or ten hours a week, an imitation of this French or German life might be attempted. The language used in class should be the language studied, except for quite the early lessons, and the "Direct Method" should be adopted; plentiful conversations on topics suggested by objects and pictures should form the staple of the early part of the course; reading is necessary to connect the spoken with the written language; and written exercises are required in order to ensure accuracy of spelling: but these exercises, like the oral ones, should not consist of so-called translation, but should be the direct expression of the pupil's thoughts in French or German words. A modicum of formal grammar is necessary as an aid to the other branches of study, but all irregularities of rare occurrence should be eschewed, unless, unfortunately, the exigencies of an impending examination demand them.

With but two or three hours a week, a somewhat similar course might be pursued, but the teacher will have to adapt his proportions of time to circumstance. He should also rely more on reading as the base on which his lessons should rest.

The question is often asked, "Is it possible to teach a foreign language with only one hour, or even two, a week?" Bearing in mind the saying of Professor Max Müller that it is the labour of a lifetime to master even one language, we must say that if the student expects to become anything like proficient in the language, the answer must be a decided negative; but if by "teaching a language" we mean giving the boy such a power over the language that he may be able to express himself fairly correctly, to understand what is said to him, and to get enjoyment from reading a book in that language, then we say, "Yes, most decidedly." The method employed must be different, and although conversations on pictures, etc., should find a place in the scheme, yet more dependence must be placed on the reading book. Many people have practically discarded the reading book with classes of beginners; but yet, if a book is properly used, it is a most valuable aid in teaching, especially when the time is limited. Unless great care is exercised, pupils get into a bad habit in using their book, and never acquire the habit of understanding what they read—they understand only the translation of what they read. It is true they make the translation for themselves as they go on, but that is not enough; they must aim at understanding the book without the mental or oral assistance of their own language. The practice of making out a vocabulary of new words militates against the acquisition of this power. It is a practice that we always condemn. Words should be learnt in their context; this applies particularly to conjunctions, prepositions, and other relational words. Very frequently the glossary or dictionary is necessary before the foreign word will convey any meaning to the mind; but as soon as possible the word should be restored to its position in the sentence, and the English equivalent dropped. As soon as the French or German sentence has conveyed a thought to the mind, the student must see whether it has also supplied the means for expressing that thought. If the sentence is complex, it may be taken to pieces and used in sections or stages. For example, take the sentence: "Il y avait une fois un roi qui était si bon que tous ses sujets l'adoraient." The student thinks of the existence of a king, or the teacher asks him to state that a king existed, not by asking him to translate, "There was once a king," but by the use of words as far removed from a literal translation as possible. The student then expresses this simple thought by saying, "Il y avait une fois un roi." Then thinking of one of his prominent qualities, he says, "Il y avait une fois un bon roi;" or, substituting an adjectival clause for the adjective, he says, "Il y avait une fois un roi qui était bon." Finally, thinking of the degree and result of the king's goodness, he says, "Il y avait une fois un roi qui était si bon que tous ses sujets l'adoraient."

Exercises in pronunciation should be taken with the reading in all the earlier lessons, and the pupil should be encouraged to read aloud at home the passage he has to prepare. In class it is a good practice to allow the pupils to look at the sentences one at a time, and when the sentence has conveyed a thought to the pupils' minds, the teacher may call on one to express that thought either in English or in French, telling which only at the moment of naming the pupil he calls upon. This ensures attention and mental effort on the part of the whole class, and the pupil feels that he can really speak (a little) French.

LES ALPES.

Allegro risoluto. *(By permission.)* J. G. Leib.

1. Sa - lut ! gla-ciers su - bli - mes ! Vous qui tou-chez aux cieux ! Nous gra - vis-sons vos ci - mes A -
2. Sur ces hau-teurs tran-quil - les Le cha-mois broute en paix ; Le bruit loin-tain des vil - les Ne
3. Voi - ci la cime al - tiè - re, Au front au - da - ci - eux, D'où l'ai - gle té - mé - rai - re Va

vec un cœur joy - eux. La nei - ge se co - lo - - re ; L'air est pur, l'air est frais ; Al-
l'at - tei-gnit ja - mais. C'est i - ci qu'on ou - bli - - e La terre et ses dou - leurs ! C'est
vi - si - ter les cieux. O cé - les-tes cam - pa - gnes ! Na-ture, im-men-si - tés ! Chan-

lons cher-cher l'au - ro - re Sur les plus hauts som - mets, Sur les plus hauts som - mets !
i - ci la pa - tri - e De tous les no - bles cœurs, De tous les no - bles cœurs !
tons sur les mon - ta - gnes, Chan-tons la li - ber - té, Chan - tons la li - ber - té !

E. Rambert.

SUGGESTIONS FOR A COURSE OF READING IN FRENCH.

BY W. T. THOMPSON, B.A. (LOND.).

FRENCH classics are distinguished by clearness and ease of expression and harmony of diction. When French ease and grace are combined with a brilliant play of fancy, striking antithesis, or nobility of thought, the result is seen in a work which is capable of affording the purest enjoyment to a student who has mastered the initial difficulties of the language. M. Albalat has lately shown us what immense trouble the masters of French style have taken to polish their phrases. By a comparison of the original manuscripts of Chateaubriand, Buffon, La Fontaine, etc., with the many revisions and re-revisions to which they have been subjected, he has shown us how weak and colourless or diffuse sentences have been converted into vigorous, clear-cut expressions, which suggest even more than they actually state; how judicious condensation strengthens the general effect; and how, often after much searching, an author finds the exact words which fit the idea he wishes to convey. He has also shown us how harmony is obtained by eliminating sounds which offend the ear, and how transposition or substitution makes the whole phrase run smoothly. A study of his work (*Le Travail du Style*, published by Armand Colin, Paris, at 3·50 francs) will suggest to a reader many good criteria of style, and help him to understand why certain great writers are looked upon as masters of style.

Whether a student aspires to writing pure, clear, and harmonious French or not, he should endeavour to cultivate his appreciation of style. To that end he should—at least until his taste is well formed—read only the works of those great writers whose charm of style constitutes one of their titles to fame. When he has acquired some critical faculty he may be less particular as to what he reads, but while he is still in the early period of his study he should read nothing written by writers like Dumas the elder, Erckmann-Châtrian, Jules Verne, and Zola. M. Albalat proscribes the first of the four writers mentioned above, but says nothing of the others—partly, no doubt, because of their more recent date, and partly because some of them are only of the second or third rank. I have mentioned the last three because they are French writers whose names are well known in England. Notwithstanding the fact that many of the works of those four writers are interesting in themselves, they should not be read until the student's taste is matured. A similar remark applies, but in a less degree, to the works of Théophile Gautier and Georges Sand. Under the same ban I would place the greater part of the works of romance which are produced in such abundance by French novelists at the present day.

The student who aims at writing clear and polished French should commence by a study of the authors of the Augustan period of French literature—the period of Louis the Fourteenth. Pascal in his *Provincial Letters* will show him how French prose can be used to express delicate irony and polished sarcasm, and in his *Pensées* to convey the profound reasoning of one of the ablest Christian apologists who has ever lived. He should also read La Rochefoucauld's *Maxims*, which will delight him by the polish of the phrase and by the profound knowledge of human nature—usually on its less praiseworthy side—which they display. The *Caractères* of La Bruyère and the letters of Mme. de Sévigné should also be read. These letters are perfect models of easy, charming, and graceful French. Above all, he must not neglect the great sermon writers of the period. He should read the *Oraisons funèbres* both of Bossuet and of Fléchier. Let him notice how the latter shines by the harmony of his language and his choice of words, and the former by his use of bold and striking figure. In verse he should read the tragedies and comedies of Racine and Corneille, and exercise his growing critical faculty by comparing the restrained charm of Racine with the bolder flights of his great rival. One could hardly call Molière a great stylist, but I think he might be read at this stage of the student's progress. It will be interesting to the student to notice how, as a writer of comedies, he drops into colloquialisms which do not now exist in modern French. In reading Molière, a book like Génin's *Lexique de la Langue de Molière* should be used for the obsolete expressions. La Fontaine's *Fables* should also be read. Boileau's satires should be read for their perfection of polished phrase and their keen criticisms. Among eighteenth-century authors Montesquieu deserves a high place as a stylist. His *Lettres Persanes*, *Grandeur et Décadence des Romains*, and *Esprit des Lois* should be read. For the prose of this century Voltaire and Rousseau should be read. We would recommend the reading at least of the *Vie de Charles XII.* and the *Siècle de Louis XIV.* of Voltaire, and the *Emile* of Rousseau. Coming to later times, Chateaubriand, Paul Louis Courier, and Flaubert should be read for the cultivation of style. The works of Chateaubriand we should recommend are *René* and *Génie du Christianisme*, and of Flaubert the historical novel *Salammbô*. Paul Louis Courier's letters, his political articles, and his *Pamphlet des Pamphlets* should also be read.

We have been endeavouring above to give some idea of a course of study which a student might enter upon with the view of gaining a critical appreciation of style in French. We are only too well aware that we have omitted many works which might be recommended with the same object, and that other authors than those mentioned might have been included, but we had to consider both the restrictions of space of this journal and the limited leisure of many of our students. We shall conclude by giving a list of good French novels and plays which we recommend to our readers. Here again we must offer an apology. We have not ventured to recommend anything we have not read ourselves, and that must be our defence if we leave out anything which our readers might think we should have included. We include in our list only novels of which the style is good, and which we could recommend sister, wife, or daughter to read. We have attempted, to a small extent, to graduate them in point of difficulty.

Souvestre's *Serf*, *Le Chevrier de Lorraine*, *Un Philosophe sous les Toits* are easy and interesting. Biart's *Quand j'étais Petit* is a delightful work, portraying the feelings and experiences of a child as they appear in reminiscence to an old man. So is also Hector Malot's *Remi et ses Amis*. Jean de la Brète's *Mon Curé et mon Oncle* describes with charmingly easy touch the *espièglerie* of a young girl who has been brought up by an unsympathetic female relative. *La Canne de Jonc*, by Alfred de Vigny, is an interesting novel which will be appreciated by those who have some knowledge of the history of the early part of last century. Jules Claretie's *Pierrille* is a beautiful tale of simple, uncalculating love and self-sacrifice. Sandeau's *Mdlle. de la Seiglière* is a witty comedy, bringing into sharp contrast the ideas and feelings of the men of the *ancien régime*, and of the new men of the Revolution. Alphonse Karr's *Voyage autour de mon Jardin* is not exactly a novel. The author chats in a discursive way, with light and easy grace, about his flowers, and digresses in the most inconsequential but witty manner. The whole of the Tartarin series by Alphonse Daudet (*Tartarin de Tarascon*, *Tartarin sur les Alpes*, *Port Tarascon*) should be read. *Tartarin de Tarascon* must be read to appreciate the serio-comic figure of the hero. Honoré de Balzac, although a voluminous writer, took some care over his style. Most of what he has written can be read with enjoyment, although his descriptions of scenery, persons, and places are at times a trifle too long. We especially recommend to our readers *Le Père Goriot*, a tale of a French King Lear of the lower *bourgeoisie*; *La Recherche de l'Absolu*, which turns on the way in which the pursuit of a great idea overmasters and controls the whole of a man's life; and *La Peau de Chagrin*, a somewhat mystical tale, turning on the possession of an amulet which secures for its holder the fulfilment of his wishes, but at a cost which the reader of the novel must find out for himself. Prosper Mérimée's *Colomba* transports the reader to Corsica, with its brigands and its family feuds. Coming down to more recent time, Pierre Loti has written much which will charm the reader. In the *Pêcheur d'Islande* he has become the interpreter of the life and feelings of the Breton fishermen, and has evolved a beautiful tale out of their simple lives.

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

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SCHOLARSHIP COURSE FOR 1903.

Ninth Month—September.

(*N.B.*—**I should be glad if students who intend to follow this course regularly would send their names and addresses to me.**)

Work for the Month.

1. *Reading.*—Prepare carefully *Esmond*, Book III., chaps. i.-vii. Note the remarks made last month on the importance of *oral* reading. Mere repetition of words without due attention to the proper interpretation of meaning is of comparatively little use.

2. *Repetition.*—See above. Those students who have not yet been examined should give continual care to examination and study modulation of voice.

3. *Teaching.*—Chaps. ix.-x., *Scholarship School Management:* The Teaching of Geography and History.

As both these subjects are usually taught, the proper methods to employ should be carefully studied.

Geography is an important subject, not only from its practical value, but also as a means of mental training. The former is obvious. Our vast empire and trading connections bring us into contact with all nations, and no one can read a newspaper to understand it without some considerable acquaintance with the subject. To the emigrant, to the merchant, to the sociologist, a thorough knowledge is imperatively necessary. The subject also presents numerous opportunities of training and developing the observation, memory, and judgment.

The great difficulty lies in the vast number of facts to be taught which are largely independent of others. In arithmetic, or grammar, or elementary science, new facts may generally be deduced from what has been already learnt; but in geography the most complete knowledge of one country does not enable one to deduce the name of a cape, or bay, or town in another. With the climate, and with animal and vegetable productions, much may be done by reasoning and analogy, but there always remains a large proportion of isolated facts, and the great problem in teaching the subject is how to present these facts in such a way that they can be remembered and understood. One of the greatest means is map drawing, which is always interesting to a class. To take an example. Suppose a teacher is about to give lessons on the coast of England. In many cases this might be attempted by writing out lists of capes, bays, etc., and committing them to memory by continual repetition, with the result that a child can repeat the name of every cape and bay, and yet have no idea of the coast line. This is palpably wrong. The correct method would be to take an imaginary voyage down the coast. The teacher would draw the outline as he proceeds, fill in the names of capes, bays, islands, river mouths, ports, with such explanations as are necessary—for example, Holy Island. Why is this so called? What is the meaning of Flamborough, Newcastle, Wallsend, etc. When the lesson is done, the children should draw the map, two or three times if necessary, and subsequently write a description of the coast. The same method should be followed with rivers, etc. Every attempt must be made, by description, anecdote, picture, etc., to create a keen interest. Whether a lesson is a success or not depends entirely upon the teacher.

History is also a most interesting study for children. It is practically useful to any citizen of the British Empire, and also a valuable means of mental training if taught properly. The facts have more relation to each other than in geography, since the whole course of any nation's history is one long chain of the interaction of cause and effect. The three natural divisions of a lesson on nearly any event are: (*a*) The causes which produced it; (*b*) Details of the event; (*c*) The after-effects or results. Many events, considered by themselves, are uninteresting and unintelligible; considered as a link in a chain of events, are replete with interest.

For younger classes, teaching history by means of biography on the concentric plan is generally adopted, since the personal element creates immediate interest. Thus the whole of the Saxon period can be dealt with in a series of lessons on Alfred. His position as King of Wessex necessitates an explanation of the various kingdoms and how they were formed, his contest with the Danes, the whole subject of Danish invasions, his law reforms, the subject of Anglo-Saxon laws and institutions, his church reforms, the introduction and development of Christianity, and so on. From the one character a series of ever-widening rings originates as from a pebble dropped in smooth water.

In notes of lessons on historical subjects, pupil teachers often find great difficulty with the *method*, and frequently the only mode of teaching is *telling*. This is not enough; there must be explanation, illustration, reasoning with the class, the use of pictures, diagrams, plans, maps, etc.

4. *Drawing.*—One or two copies each week to fairly fill a half imperial sheet of paper, lined in with brush and sepia.

5. *Music.*—Continue practice in transl'ation from one notation to the other.

6. *Penmanship.*—Ten minutes' daily practice from the *Practical Teacher Copy Book*, and care at all times.

7. *Composition.*—Write one or two essays each week on such subjects as:—

(1.) Why is London the greatest city on earth?
(2.) The Commonwealth of Australia.
(3.) The National Debt.
(4.) The Argonauts.
(5.) Life in the times of Esmond.
(6.) The character of Orlando.
(7.) "The old order changeth, yielding place to new."
(8.) "All is not gold that glitters."

The following notes may indicate the line to be taken:—

(1.) (*a*) The capital of the greatest empire.
(*b*) The character of the British.
(*c*) The enormous trade.
(*d*) The situation on a tidal river, sufficiently remote from the sea to prevent ready attack, but not to hinder water-borne trade.
(*e*) The centre of the land hemisphere.

(2.) Treat this historically. Sketch the rise from a convict station to separate states; then deal with the necessity for union.

(3.) (*a*) How originally formed—William the Third's inability to raise money on his personal security.
(*b*) Sketch the increase (see Whitaker for figures).
(*c*) To whom is the debt owing.
(*d*) Discuss the advantages and disadvantages.

(4.) The "Heroes" will supply all the matter. Tell the story in your own words, as briefly and clearly as you can.

(5.) The material for this will be found in the book. Addison's *Spectator* papers will also assist. It is impossible to deal with every point, so make a selection of dress, manners, political feeling, social life, etc.

(6.) See text-book. Substantiate your opinions with apt quotations.

(7.) This line from the "Passing of Arthur" is as true now as then. We are continually dropping fashions, modes of thought, etc., in face of the new revelations of science.

(8.) Deal as with other proverbs. (i) The literal meaning; (ii) the wider and more general application; (iii) examples in life.

8. *English.*—

(1.) Learn twenty-five roots and meanings per week.
(2.) Prosody—the laws of verse.
(3.) *The Task*, Book V., lines 283-304.
(4.) *As You Like It*, Act IV., Scenes ii. and iii.; Act V., Scene i.

Notes on English.

1. *Prosody.*

In learning the various measures, the following lines of Coleridge will help both in nomenclature and example:—

Trochee | trips from | long to | short
From long to long in solemn sort

Slow spon | dee stalks | strong foot yet | ill able

Ever to | come up with | dactyl tri | syllable

Iam | bics march | from short | to long |

With a leap | and a bound | the swift an | apests throng ||

One syll | ble long with | one short at | each side

Amphibrach | ys hastes with | a stately | stride.

Note also what is blank verse, heroic measure, etc.

Candidates should be prepared to scan any lines of *The Task* or the play. Most editions of the latter have special notes on the metre, which should be studied.

2. "*As You Like It.*"

Act IV., Scene ii.—*The rest shall bear this burden.* This is a stage direction, and not part of the song. The first three lines are sung as a solo, and then the whole company join in the latter part.

Scene iii.—*Writing of.* The "of" is unnecessary. It is still used in the same way by illiterate persons—for example, "What are you doing of?"

The anger of Phebe was partly assumed, to deceive her messenger; partly perhaps natural, at the feeling that she was scorned.

Phœnix, the mythical bird, of which only one existed at a time. When old it set fire to itself, and out of the flames came a new bird.

Turk to Christian. A reference to the numerous personal combats which took place in the time of the Crusades between Saracens and Christians.

So please you, if it so please you.

Phebes me, shows her cruelty to me. Rosalind attempts to persuade Silvius that the letter is harsh and unkind when it is not, probably out of her natural kindness, which did not like to see any one suffer.

By him seal up thy mind, make up your mind, write your decision, seal it, and let him bring it to me.

To make thee an instrument, to use thee when convenient, and throw thee aside when useless, as one does an instrument.

Purlieus, the open ground on the outskirts of a forest.

Neighbour bottom, neighbouring dell.

Eye may profit by a tongue, may take the advantage of a description.

Browner than her brother. See Act I., Scene iii., line 104: "I'll.....with a kind of umber smirch my face."

Within an hour. Two hours was the term mentioned by Orlando.

Indented glides. The snake moves by curving from side to side, not up and down.

A lioness with udders all drawn dry, a lioness which had to feed her cubs by suckling, and hence would probably be more than usually hungry and ferocious.

To prey on nothing that doth seem as dead. Animals of the cat kind all prefer to kill their own prey, and will often refuse to touch what they have not killed, unless they are particularly hungry.

Nature stronger than his just occasion. His natural good feelings overcame the temptation to leave his brother to his fate. One wonders why the lioness should have waited so long hungry when Celia's sheep were close by.

I awaked. Oliver does not disclose his identity till he has aroused their interest and sympathy.

How I came into that desert place. The duke had been as good as his word in his treatment of Oliver.

Cousin Ganymede. In her alarm, Celia nearly gives the secret away. She should have said *brother*.

You a man! Said in irony, to which Rosalind's "I do so" is a fitting answer.

A body, a person; used familiarly—for example, "Gin a body meet a body," etc.

Counterfeited. Rosalind's attempt to persuade Oliver that the fainting was pretended fails entirely. "The testimony in her complexion," her pallor, betokened the real thing. Though feeling very ill, she keeps up her assumed character well. "I should have been a woman by right" is exquisite under the circumstances.

Act V., Scene i.—*Old gentleman*—that is, Jacques.

We shall be flouting, we must have a wordy contest.

Cover thy head, put on thy hat. Touchstone's assumption of superiority all through the scene is irresistibly comic. It serves a double purpose—to warn off William, and to impress Audrey with the learning of her new lover.

The heathen philosopher. Either this is meaningless bombast, or it is a hint to William of "sour grapes."

9. *Geography.*—(1) New Zealand; (2) revise North America.

New Zealand.—Area, 104,751 square miles. Population, 790,000 Europeans and 43,000 Maoris. By the treaty of Waitangi, in 1840, the native chiefs ceded the sovereignty of the island to the Crown, but retained possession of the lands, forests, etc., of the reservations. Some account of this remarkable people should be read. Froude's *Oceana* supplies much information.

In the physical features, the wonderful phenomena of the North Island should be studied. The famous Pink and White Terraces are now no more, having been destroyed by a volcanic eruption.

The scenery of South Island is also worthy of note.

The climate is adapted for raising every fruit, flower, and vegetable that flourishes in Great Britain. Amongst the productions are the kauri pine, valued for shipbuilding and for its resin (kauri gum); and the native flax, or *Phormium*, used in the manufacture of ropes and twine.

The principal exports are wool, frozen meat, gold, butter, cheese, agricultural products, tallow, kauri gum, and timber. Rich iron ore, coal, and copper are also found. The chief imports from the United Kingdom are apparel, arms, chemicals, cotton goods, iron and steel goods, woollen goods, paper, machinery, and spirits.

Towns.—Wellington, Auckland, Dunedin, Christchurch, Sydenham, Invercargill, Napier, Nelson, Oomaru.

Government.—Responsible government.

(1.) Governor appointed by Crown (Earl of Ranfurly).

(2.) Legislative Council of forty-four.

(3.) House of Representatives of seventy-four (four of whom are Maoris).

10. *History.*—George the First, George the Second, George the Third to 1783.

Chief Points.—A complete genealogical table of the Hanoverians must be learned.

George the First.—(1.) The Riot Act rendered necessary by the violence shown at the elections.

(2.) The Rebellion of 1715, and the passing of the Septennial Act, which, though put forward as a temporary expedient, has never been repealed.

(3.) The South Sea Bubble. The South Sea scheme was a sensible project, and quite likely to be successful if properly managed. The mistake made was in paying the Government over £7,000,000 for the monopoly, and then wasting the money which was subscribed. The whole business was over-capitalised and mismanaged.

(4.) The affair of Wood's Halfpence. The indignation in Ireland was wholly unjustified, and was mainly due to Dean Swift's *Drapier Letters*.

George the Second.—(1.) Walpole's administration and methods; Excise Bill.

(2.) The war with Spain.

(3.) The War of the Austrian Succession. Read Macaulay's *Frederic the Great* for this.

The English policy throughout this and the Seven Years' War was to attack the French, and not to side either with Frederic the Great or with Maria Theresa.

The causes of the War of the Austrian Succession are important, and must be thoroughly understood.

(4.) The Reform of the Calendar, rendered necessary by the calculation of the year at 365¼ days, which was eleven minutes too long. This amounts to about three days in four hundred years, and hence, in 1752, it had amounted to eleven days. To prevent such a mistake in the future, it was arranged to drop three days in every four hundred years—that is, those centuries where the first two digits do not divide by four were not to be leap years, as they in ordinary cases would.

(5.) The Seven Years' War. The causes were threefold.

(*a*) In Europe. Maria Theresa had, since 1748, secured the co-operation of all the European powers in her attack on Frederic. George, fearing for his Hanoverian possession, took the side of Frederic.

(*b*) In North America. The attempt of the French to ring in the British colonies by a chain of forts, and thus deprive them

of the valuable fur trade with the North-West, rendered action imperatively necessary here.

(*c*) In India, the schemes of Dupleix threatened to exterminate the English East India Company.

In Europe, England took little part in the fighting. In North America, Wolfe secured Canada; and in India, the genius of Clive laid the foundation of our Indian Empire.

1759. "The most glorious year England has ever seen," on account of the numerous victories gained.

George the Third.—(1.) Treaty of Paris laid a solid foundation for the empire.

(2.) "Wilkes and Liberty." Note that Wilkes was popular because he was fighting for a principle—the right of papers to criticise the actions of the Government.

(3.) The War of American Independence. The position of the colonies was very unfair. They were tied down to trade with the mother country, and were generally considered as a collection of convicts and ex-convicts. Note the steps by which their irritation was goaded into actual fighting; that there was no desire at first to separate from the mother country.

The causes of success should be noticed.

(*a*) The colonists were at home, and fighting for their liberty (always a strong stimulus).

(*b*) The colonists fought in Indian fashion, and not in solid masses of troops.

(*c*) The colonists could easily procure supplies; the British army could not.

(*d*) France and Spain joined the war against England, in revenge for the outcome of the Seven Years' War.

Rodney's great victory in the West Indies was the only redeeming feature of the war, and procured us better terms in the peace which was signed than would otherwise have been the case.

11. *Arithmetic.*—Next 100 sums in the general examples (Christian and Collar). Measurement of areas and solids. This is fully explained in the text-book. The mistakes that are usually made arise from not remembering that length and breadth = area (square measure); square measure multiplied by linear measure = cubic measure; area divided by linear measure = linear measure; cubic measure divided by linear measure = square measure, by square measure = linear measure.

12. *Algebra.*—Surds. Read up the theory. Rationalising and surd equations are the points to be chiefly noted.

13. *Euclid.*—Revise first half of Book I., with ten deductions per week.

14. *Science.*—Preparation, properties, etc., of marsh gas, coal gas, hydrochloric acid, sulphuric acid, and nitric acid.

15. *General Information.*—Work one or two papers in the book of questions used.

Notes on the July Paper.

1. "Optical illusion" was fairly well explained.

2. The subject of Old Age Pensions was generally not known. It is perhaps a topic somewhat outside a pupil teacher's work, but some knowledge of the subject is advisable.

3. Generally well done.

4. This puzzled some candidates. The top of a lighthouse in turning round with the earth must describe a larger circle than the bottom, and as both are done in the same time, it necessarily follows that the top must move at a slightly greater speed. It does not fall because its centre of gravity always remains perpendicular over the base.

5. Most of these terms were known. The Primum Mobile in the Ptolemaic system of astronomy was the outside sphere which gave motion to the others and caused day and night—the motions of the planets, etc. The Raid of Ruthven was an attempt by William, Earl of Gowrie, to seize the person of the young king, James the Sixth, in order to use him for his own ends.

6. The events referred to are—

(*a*) The loss of the *Royal George*.

(*b*) The famous ball at Brussels on the eve of Quatre Bras.

(*c*) Sir Richard Grenville's fight with the Spaniards at the Azores. (See Tennyson's poem.)

(*d*) Edinburgh after Flodden.

(*e*) "C'est magnifique, mais ce n'est pas guerre." Marshal Canrobert's remark on the charge of the Light Brigade.

(*f*) The siege of Lucknow.

(*g*) The execution of Charles the First.

7. Well done.

8. Generally well done. *Viva voce* = orally as opposed to written. *Cui bono?* For whose good?

Test Questions on General Information.

The answers to these questions are marked gratis. They should be written on foolscap, and on one side only; the coupon of the present number and a stamped addressed envelope must be enclosed. All papers must be sent direct to Mr. A. T. Flux, Oakleigh, Belvedere, Kent. A prize of one guinea will be given to the student securing the highest percentage of marks on the course.

1. What is the use of a lightning conductor, and how does it act? Name a very safe and a very unsafe place during a thunderstorm.

2. "These bodies of ours are living stoves." Explain this.

3. Complete the following quotations, and say whence they come:—

(1.) Sweet are the uses.....
(2.) A thing of beauty.....
(3.) The rank is but.....
(4.) Oh that those lips.....
(5.) And God fulfils Himself.....
(6.) Tell me not in.....
(7.) The paths of glory.....
(8.) A little knowledge.....

4. Who are the Ainos, Ghoorkas, Haussas, Samoyedes, Sioux, Pathans, Maoris?

5. Explain the terms:—Monro Doctrine, The Woolsack, Blue-Book, the Gordian Knot, the Greek Calends.

6. Where and what are the Coliseum, the Leaning Tower, the Mammoth Cave, the Blue Grotto, the Bois de Boulogne, the Stock Exchange?

7. Give five instances in nature of animals being particularly suited to their surroundings and mode of life.

8. What is the weight of a stone of meat, a quartern loaf, a sack of coals? the value of an angel, a noble, a tester, a groat?

Test Questions.

1. *Penmanship.*

Large Hand.—*Experimental knowledge.*

Small Hand.—*A daughter of the gods divinely tall,*
And most divinely fair.

2. Explain how you would give a first lesson in analysis.

3. Write an essay on Thrift.

4. Analyse the following, and parse words in italics:—

So holy and so perfect is my love,
And I in *such* a poverty of grace,
That I shall think *it* a most plenteous crop
To *glean* the broken ears after the man
That the main harvest reaps.

5. Explain metaphor, simile, metonymy, hyperbole, and give examples from the poetry you have studied.

6. Say what you can of Australian trade. With what countries is it mainly carried on?

7. Give the causes and results of the War of the Spanish Succession.

8. What were the chief constitutional changes consequent on the Revolution?

9. Work the following:—

(1.) At what price must I buy a 4 per cent. stock with the proceeds of the sale of £9,600 3 per cent. stock at 86¾ in order to make no change in my income, allowing ¼ per cent. brokerage?

Ans. 115.

(2.) A person possesses £3,200 in the 3 per cents. which he sells at 99¼; he invests the proceeds in railway shares at £56 a share, which shares pay £5 per cent. interest on £45, the amount paid on each share. How much is his income altered?

Ans. £32, 5s.

(3.) If I lay out £4,198 in the purchase of 4½ per cent. stock at 87½, at what price must I sell in order to gain £260, ¼ per cent. brokerage being charged on each transaction?

Ans. 92¾ (without brokerage).

(4.) By transferring my investment of £24,000 3½ per cent. stock to 3 per cent. I lessen my income by £38, 8s. If I sold the former at 104½, at what did I buy the latter?—the broker receiving ¼ per cent. on the former transaction, and nothing on the latter.

Ans. 93¾.

10. How would you prepare chlorine, and what experiments would you work to show its properties?

11. Write the following from dictation (the passages should be read *once* distinctly, and then dictated *once* in portions as marked. Full stops only should be given):—

The disinclination | at the present time | to read anything | requiring even a momentary study | is a striking | and melancholy characteristic | of the present generation. | We peruse newspapers | novels, gazettes, and magazines | with the greatest avidity | while we are repulsed | by the very opening | of a volume | on such a subject | as political economy | logic | or ecclesiastical history. | And while we can with assiduity | for hours pore over | the latest work of fiction | of the most mediocre kind | we listen almost impatiently | to the explanation | of what

is a promissory note | a bill of exchange | or a logical syllogism | in an argument. | When such erroneous | and necessarily superficial knowledge | becomes stereotyped | as it were | on our memory | we are incapable of imparting | any valuable information | to others | and our empirical formulas | are received | by those better informed | with some amount of suspicion. |

Another distinguishing quality | of the information of the present day | is its want of discrimination | and accuracy. | We usually obtain information | about things | in such an unsatisfactory manner | accompanied by much inattention | on our own part | that instead of well-digested | and important truths | we have merely | vague and confused ideas | possessing, strictly speaking, no value. | And when we try | to communicate our ideas to others | we do so | at the expense of truth itself | and the risk of losing | our character for intelligence.

PUPIL TEACHERS' COURSE.

For Candidates' Examination, 1904.

Work for the Month.

1. *Reading and Repetition.*—Take plenty of oral practice with both these subjects. Endeavour to express the *meaning* of the piece you read or recite by modulation of the voice.

2. *Penmanship.*—Ten minutes' daily practice from the *Practical Teacher Copy Book*. A thoroughly good style should be adopted at the beginning of your career. This will save much difficulty and loss of marks later on.

3. *English.*—*The Elegy*, verses 17–20. Analyse and parse the whole. Learn the meanings of all allusions, and the derivations of the chief words.

The general meaning of the four verses may be freely rendered thus:—

Verse 17. Their position in life not only precluded them from achieving greatness, but also prevented the possibility of their committing great crimes. They had no opportunity to fight their way to the throne, thereby causing the death of thousands of innocent beings; they could not by harsh laws and heavy taxes render the lives of other men well-nigh unbearable.

Verse 18. They never had to listen unmoved to talk which in their humbler position they would blush at; they had not to lie and deceive; they were ignorant of the shame which a poet felt who was bound to flatter the proud, wealthy, and corrupt in his verses, if he wished to obtain any remuneration from them.

Verse 19. Living in this secluded village, content with their lot, they did not even know how to envy the wealthy and great, but pursued their regular round of occupations in peace, undisturbed by the bustle and rush of the outside world.

Verse 20. And when they died they were not entirely forgotten. Although they had no splendid monument raised to them, yet the love of their friends and children erected some rude tombstone, roughly carved, and with an illiterate inscription, which was an evidence to the passer-by of the esteem in which they were held, and appealed to him for sympathy.

Supply *their lot forbade* to verse 18. The infinitives in it—*to hide, to quench, to heap*—are the objects of forbade.

Note analysis of verse 20.

Connecting word—Yet.

Subject—Memorial.

Enlargement of subject—Some frail.....still erected nigh to protect these bones from insult, decked with uncouth rhymes and shapeless sculpture.

Predicate—Implores.

Object—Tribute.

Enlargement—The passing.....of.....sigh.

4. *Arithmetic.*—Application of vulgar fractions to weights and measures; continued fractions.

A very usual mistake with candidates when asked to find the value of, say, $\frac{1}{19}$ of £34, 2s. 10d., is to reduce the money to pence, state as an improper fraction, then multiply and reduce back. This is quite unnecessary in most cases. Multiply the money, or whatever it may be, by the numerator *in one line*, and divide by the denominator.

5. *Geography.*—Finish England and Wales. Use plenty of sketch-maps. Make quite sure of the exact position of all towns you learn, the rivers on which they stand, etc.

6. Henry the Fifth to Henry the Seventh.

The text-book will supply the necessary information.

Chief points:—

(1.) Henry the Fifth's successful campaign in France.

(2.) The war with France during the minority of Henry the Sixth. The Burgundian alliance—very important.

(3.) The Wars of the Roses.

(i) Causes.

(ii) Chief battles, leaders, dates, and results.

(iii) Results. (*a*) Final downfall of the Feudal System. (*b*) Great personal power of the Tudors.

(4.) Henry the Seventh. His descent.
Plots against him, and their outcome.
Methods of raising money.

7. *Elementary Science.*—Conversion of rectilinear into circular motion. The lever.

Note carefully the three orders of levers, with illustrations in common life. Remember: Weight multiplied by its distance from fulcrum always equals *power* multiplied by its distance from fulcrum (when the lever is in equilibrium).

8. *Music.*—Whole-pulse notes, half-pulse, continuations, and rests.

Questions on Last Month's Work.

1. Analyse the following, and parse words in italics:—

"*Full many* a gem of *purest* ray serene
The dark unfathomed caves of ocean *bear*;
Full many a flower *is born to blush unseen*,
And *waste* its sweetness on the desert air."

2. Write a short essay on the Black Prince.

3. Work the following:—

(1.) Simplify— $\frac{1\frac{1}{5}}{9\frac{9}{11}} \times \frac{3\frac{3}{4}}{1\frac{1}{2}} \times \frac{2\frac{1}{2}}{\frac{5}{100}} \times \frac{1\frac{1}{2}}{4\frac{2}{7}}$. Ans. $\frac{55}{111}$.

(2.) Find the value of—

$(1\frac{7}{8} + 2\frac{1}{2})(9\frac{1}{2} - 7\frac{1}{7})(\frac{3}{4} - \frac{7}{15} - \frac{3}{45} + \frac{2}{3})$. Ans. $4\frac{1}{2}$.

(3.) I read $\frac{2}{5}$ of a book on one day, and $\frac{1}{3}$ of the remainder on another day. Thirty pages remain unread. How many pages did the book contain? Ans. 240.

(4.) Simplify— $\frac{(\frac{1}{12} + \frac{1}{16}) \text{ of } \frac{8}{14}}{(\frac{1}{12} - \frac{1}{16}) \text{ of } \frac{4}{21}} \div \frac{\frac{2}{5} + (\frac{2}{3} \text{ of } \frac{1}{4})}{\frac{2}{5} - (\frac{2}{3} \text{ of } \frac{1}{4})}$. Ans. $4\frac{1}{2}$.

4. Describe with a sketch-map the basin of the Severn or Trent.

5. What was the Black Death? What result had it upon the labourers?

6. Give an account of the Peasants' Revolt. What were their demands?

7. Write examples of 2, 3, and 4 pulse measures.

8. A force of 15 lbs. acts due north, one of 20 lbs. due east, one of 25 lbs. due south, and one of 40 lbs. due west. Draw a diagram to represent these, and work out the direction and force of the resultant.

First Year.

1. *Reading and Repetition.*—Regular oral practice is necessary. Every care must be paid to enunciation and to modulation of voice, so as to give the meaning of the passage read.

2. *English.*—Cowper, *Expostulation*, lines 147–186; or *The Task*, Book V., lines 147–186.

Paraphrase and analyse the whole, and parse any word presenting difficulty. Write for any assistance required. Learn the derivation of all important words.

3. *History.*—Henry the Fourth, Henry the Fifth, and Henry the Sixth.

Chief points:—

As Henry obtained the crown by consent of Church and Parliament, he had to compensate them—

(1) By allowing the Church to act severely against the Lollards, and hence the statute *De Heretico Comburendo*.

(2) By granting increase of power to the Commons, who obtained the right of originating money grants and of controlling the general expenditure.

The barons did not settle down under the rule of one who had been merely one of themselves, hence the four plots against the king.

Henry the Fifth directed their attention to a common foe in his very successful campaign in France. Learn plan, etc., of battle of Agincourt.

Henry the Sixth.—The French war is important. Note the cause of English success—the Burgundian alliance. The Duke of Burgundy, who was nearly as powerful as the French king, allied himself to the English, because his father had been assassinated by the order of the French Dauphin.

As long as this alliance lasted, the two countries together were too powerful for the French.

Bedford married the sister of the Duke of Burgundy. She died, and he very imprudently married Jacquetta of Luxembourg, a ward of Burgundy, without the latter's consent. This caused the dissolution of the alliance and the downfall of the English supremacy. Joan of Arc did something to raise the spirits of the French, but this alone would not account for the total loss of all the French provinces which followed.

The misgovernment at home led to much discontent.

The Wars of the Roses.—Prepare a table showing the exact descent of Henry the Sixth and the Duke of York and the Somersets. Learn a table of the battles and their results.

4. *Geography.*—Asia. Physical features. Prepare very carefully with a sketch-map. Get a general idea of the contour—an inverted basin with an elevated centre surrounded by a ring of mountains and sloped north, east, south, and west. A proper appreciation will explain much in the climate and productions.

5. *Arithmetic.*—Continue exercise in profit and loss. Work all the examples given in Christian and Collar—a particularly full and wide set.

6. *Science.*—Analysis of light by a prism, and recomposition. The spectrum, visible and invisible.

7. *Mathematics.*—Euclid. Props. 15–20, with three deductions per week.

8. *Algebra.*—Multiplication.

Test Questions.

1. Analyse one of the following, and parse words in italics.

(1.) "Silently *as* a *dream* the fabric rose;
No sound of hammer or of sword was there.
Ice upon ice, the well-adjusted parts
Were soon conjoined, nor *other cement* asked
Than water interfused to *make them one.*"

(2.) "Rhetoric is artifice, the *work* of man,
And tricks and turns that fancy *may* devise
Are *far too mean* for Him that rules the skies.
The astonished vulgar trembled while he tore
The mask from faces *never seen before.*"

2. Describe with a plan the battle of Bannockburn. How do you account for the defeat of the English?

3. Explain clearly the causes of the Peasants' Revolt. What were their demands? How far were they successful in obtaining them?

4. Where and what are Bucharest, Dobrudscha, Crimea, Morea, Campagna, Oka, Ladoga?

5. Describe a coasting voyage from Venice to Odessa, with a sketch-map.

6. Work the following:—

(1.) A woman bought a certain number of eggs at the rate of 4 for 3d., and sold them at the rate of 5 for 4d., by which she made a profit of 2s. How many eggs did she buy? Ans. 480.

(2.) A person selling apples at 3 a penny gains 5 per cent. Find the gain or loss per cent. when 25 are sold for 6d.
Ans. 24⅔ loss.

(3.) A tradesman who makes 15 per cent. on his capital makes a profit three times as great as another who makes 12 per cent. in the same time. They unite their capital, and the joint-capital is £867, 4s. 3d. What amount did each contribute?
Ans. £612, 3s.; £255, 1s. 3d.

(4.) A man embarks his capital in four successive ventures. In the first he clears 160 per cent., and in each of the others he loses 20 per cent. Show that there remains to him a profit of 2·4 per cent. on his original outlay.

7. Write the following without change of key:—

m s f ᵐl, t, d r f m s f r ᵈs m r d.

8. An opaque screen is placed between the eye and a lighted candle. Describe two methods by which the candle may be seen without moving eye, screen, or candle. Draw diagrams to illustrate each.

Second Year.

1. *Reading and Repetition.*—Regular oral practice is very necessary, and must not be neglected.

2. *Geography.*—Central America and the West Indies. Use sketch-maps freely. Notes on the West Indies appeared recently under the Scholarship Course.

The following questions have been asked on Central America:—

(1.) Name the states of Central America, and say what you can of their people, towns, and government.

(2.) Name animal, vegetable, and mineral productions of Mexico.

(3.) Give some account of British Honduras, stating position, size, products, climate, and chief town.

(4.) Where and what are Yucatan, Nicaragua, Popocatepetl, Vera Cruz, Truxillo, Havana, Guatemala, Mexico City, San Domingo, Kingston, Greytown, Bahamas, and Trinidad.

(5.) What do you know of the Nicaraguan Canal? Describe its course, with a sketch-map.

3. *History.*—George the Third.

Chief points:—

(1.) Conclusion of Seven Years' War and terms of the Treaty of Paris.

(2.) "Wilkes and Liberty." Why the connection?

(3.) American War of Independence. What were (*a*) the causes; (*b*) the chief events; (*c*) the results? (*d*) Why did the colonists win?

(4.) The Gordon Riots.

(5.) The great industrial movement in the latter half of the century. England started its career as a manufacturing nation.

(6.) The French Revolution: (*a*) cause; (*β*) events; (*γ*) feeling in England.

(7.) War with France. Nelson's victories, especially (*a*) *the Nile*, which spoiled Napoleon's plans for an Eastern empire; (*β*) Copenhagen, which broke up the northern coalition; and (*γ*) Trafalgar, which put an end to all fears of an invasion.

(8.) The Peninsular War. Draw a map, insert all places mentioned, and follow carefully the different campaigns.

(9.) The Hundred Days and Waterloo. Learn a plan.

(10.) The Union with Ireland: causes and terms.

(11.) The years of depression following Waterloo due to (*a*) heavy taxation to pay for the enormous debt (£600,000,000) caused by the war; (*b*) the corn duties; (*c*) the increase of machinery, which threw many out of work.

4. *English.*—Milton's *Paradise Lost*, Book III., lines 397–475. Make quite sure of the meaning, analysis, and parsing. Learn derivation of the chief words. The edition of Messrs. T. Nelson and Sons gives all the notes, etc., necessary.

5. *Arithmetic.*—Continue practice at stocks. Look through all the general examples given in Christian and Collar, and be sure that you can work any of them.

6. *Elementary Science.*—Magnetism. Properties of the loadstone and artificial magnets. Induction. The earth's magnetism.

7. *Mathematics.*—Students must write for assistance in any difficulty they experience. From six to ten deductions should be worked each week.

Test Questions.

1. Write a short description of Milton's conception of the universe.

2. Describe with a sketch-map the basin of the Mississippi, marking in the chief towns.

3. Explain clearly how the United States are governed, and how a president is elected.

4. What do you know of Walpole and his policy?

5. What were the causes of the War of the Austrian Succession? Explain the part taken in it by England.

6 Analyse th following. and parse words in italics:—

"*No sooner* had the Almighty ceased, *but* all
The multitude of angels, with a shout
Loud as from numbers without number, sweet
As from blest voices, *uttering joy, heaven rung*
With jubilee, and loud hosannas filled
The eternal regions. *Lowly* reverent
Towards *either* throne they bow."

7. Explain incarnate, God-like fruition, arraigned, immortal amarant, preamble sweet.

8. Work the following:—

(1.) What principal will amount to £42,998·1696 in eight years at 20 per cent. compound interest? Ans. £10,000.

(2.) If I save £10 yearly and invest it at 3 per cent. per annum, and always put in the interest together with the saving for the four following years, what sum shall I have at the end of the time? Ans. £51, 1s. 9·92d., etc.

(3.) £800 is put out at interest at 5 per cent. per annum, and at the end of each year £120 is deducted for the expenses of the next. What is left of the original capital at the end of the sixth year? Ans. £255, 16s. 11·274d.

(4.) At what rate of interest will the present worth of £100, 10s. 3d., payable two years hence, be £93, 10s.? Ans. 3⅓.

9. How is quicklime produced from limestone? What gas is given off? What is the chemical action which takes place when lime is slaked? Why is slaked lime used as an ingredient in mortar?

10. Which of the following notes is highest in pitch, and which lowest?—

m in key A, **f**ᵗ in key C, **m** in key B♭, **s** in G, **l**, in key D.

CORRESPONDENCE: RULES.

To ensure an answer in the next issue, queries must be sent by the 15th of each month.

Name and address of sender, with coupon of current number of THE PRACTICAL TEACHER (and *nom de plume* if desired), must be enclosed.

As a rule, all replies will appear in the Correspondence Column; but any one desiring an immediate reply may obtain it by enclosing a stamped addressed envelope.

All communications and queries with regard to the PUPIL TEACHERS' AND SCHOLARSHIP COURSE should be addressed to "Mr. A. T. FLUX, The Bays, Belvedere, Kent."

OUR CERTIFICATE COURSE FOR 1904.

BY GEORGE COLLAR, B.A., B.SC.,
Head-master of the Stockwell Pupil Teachers' School.

TEST QUESTIONS ON LAST MONTH'S WORK.

THEORY OF TEACHING.

1. Compare the "Five-point" plan of drawing up notes of lessons with the arrangement as "Matter and Method."
2. What is the object of the "Preparation" section of the lesson? Show its importance from a psychological point of view.

ENGLISH LANGUAGE AND LITERATURE.

1. What are the "three unities"? What can be said in favour of their observance? How did Shakespeare gain by not observing them?
2. Explain the following words and phrases: *Within this wooden O; the scambling and unquiet time; the Gordian knot; the land Salique is in Germany puissant; coursing snatchers; congreeing.*

ENGLISH HISTORY.

1. Trace what became of the royal Saxon house after the Norman Conquest.
2. What were the duties of the feudal lord towards his vassals, and what benefits did he derive in return?
3. Describe the attempts made by the Saxons to recover their independence under the Norman kings.

GEOGRAPHY.

1. Describe the course of the Danube, and show the value of the river as a means of communication.
2. Give an account of the chief trade-routes of Europe, showing how they are dependent on the physical features, and mention the chief obstacles that have been surmounted in constructing the routes.

ARITHMETIC.

1. Show that a long division sum with no remainder in which the divisor ends in 1, 3, 7, or 9 may be begun at either end.
2. Show that if a number has an odd number of digits, the difference between the number itself and that formed by reversing the digits is divisible by 99.
3. Show that if a number is divisible by each of a series of numbers, it is divisible by their L.C.M.

ALGEBRA.

1. Divide $4x^6 - 4x^5y + 7x^4y^2 + 13x^3y^3 - 34x^2y^4 + 2xy^5 + 12y^6$ by $2x^2 + xy - 3y^2$.
2. The product of two algebraical expressions is $a^6 + a^5b + a^4b^2 - a^3b^3 + b^6$. One of the expressions is $a^2 + ab + b^2$; what is the other?
3. A sum of c shillings is divided among m men and n women, a man's share being to a woman's share in the ratio $a : b$. What does each receive?

EUCLID.

1. What is meant by the "altitude of a triangle"? Prove that triangles on the same base and of the same altitudes are equal in area.

If ABCD be a parallelogram and P any point in the diagonal AC, prove that the triangle PBC is equal to PCD in area.

2. In any quadrilateral show that the sum of the diagonals is less than the sum of the sides, but greater than half the sum of the sides.

ELEMENTARY SCIENCE.

1. What is elasticity? How could you show the elasticity of bodies to a class; and how can you obtain exact measurements of the elasticity of bodies?
2. By which properties do bodies in the solid state differ in the greatest degree from those in the liquid or gaseous state?

NOTES AND SYLLABUS FOR SEPTEMBER.

ENGLISH COMPOSITION.

Finish Part I. of Nesfield's *Composition*.

Write essays on the following subjects:—

1. Animal instinct.
2. The character of Charles the First.
3. "Genius commands admiration, character respect."
4. The song-birds of Great Britain.

THEORY OF TEACHING.

Study carefully the methods of teaching reading given in the seventh chapter of the text-book. Do not be content with reading how to teach this subject, but put the methods to a practical test by applying them to your class. This is particularly important in the matter of bringing the mind into play. Correct enunciation is a very important matter in reading, but the most successful teacher of reading is the one who teaches his children to understand what they read.

ENGLISH LANGUAGE AND LITERATURE.

Read through Sir Walter Scott's *Kenilworth*. In the first reading of a book of this sort no notes need be taken, but the dictionary should be at hand, and no word passed unless its meaning is quite clear. The general course of the action should be followed, and the different events put in their proper perspective. The reader will then be ready to go through it the second time, when he will know beforehand what are the chief events he may be expected to describe and the chief personages whose characters he may be required to delineate.

Study in detail the second act of *Henry the Fifth*.

Scene ii., line 44. *Security*, neglect of caution. (Latin *se*, apart from; *cura*, care, thought, or anxiety.) Compare—

"Upon my *secure* hour thine uncle stole."—*Hamlet*.

Hamlet's father was at the time free from anxiety. The word now means the safety which leads to the freedom from anxiety.

108. *Hoop*, now spelt *whoop*. Compare *whooping-cough*. The presence of the *w* is inexplicable. The word *hubbub* is a corrupted form of *hoophoop*, a reduplicated form of *hoop*. Compare *Coriolanus*, IV. v.,—

"Suffered me by the voice of slaves to be
Whooped out of Rome."

156. *Admit it as a motive*, allow myself to be moved by it. *Motive* from Latin *moveo*, I move; the suffix *-ive* is active in meaning.

Scene iii., line 43. *Chattels and my movables*. Being contrasted with movables, the word *chattels* seems to denote immovable property. As a matter of fact the three words, *chattels*, *cattle*, and *capital*, were originally the same, and meant a man's chief possessions. Now *capital* means that part of a man's wealth which is employed in producing wealth, *cattle* means live stock of certain kinds, and *chattels* means furniture and such-like property.

Scene iv., line 36. *Forespent*, which were formerly paid out. Be careful not to confuse *fore-* with *for-*. The former means before; the latter, against or without: for example, a *foregone* conclusion = a result settled beforehand; but to *forgo* a pleasure = to go without it.

ENGLISH HISTORY.

Study carefully the four reigns comprised in the period 1154 to 1272.

Henry the Second was only twenty-one years old when he came to the English throne. This accession made him the most powerful prince in Europe. His various possessions must be carefully noted. He inherited England and Normandy, through his mother Matilda, from his grandfather, Henry the First; and as the dukes of Normandy claimed feudal authority over Brittany, that province must be included in his inherited domains; and later on his influence in that duchy was increased by the marriage of his son Geoffrey with Constance, a Breton princess. Henry likewise inherited Touraine and Anjou from his father, and he married Eleanor of Aquitaine, and came into possession of the provinces which had been her original dowry on her marriage with Louis the Seventh of France, and which were returned to her on her divorce—namely, Poitou, Saintonge, Auvergne, Perigord, Limousin, Guienne. Thus Henry the Second was lord over all that part of France which lay west of a line running south from the mouth of the Somme, together with the province of Auvergne.

Henry's work as an administrator must be considered in detail—(*a*) suppression of about 1,100 castles which were practically nests of robbers; (*b*) issue of new and pure coins; (*c*) institution of justices on circuit, or "justices in eyre" as they were called.

Study his quarrel with the church over the liability of ecclesiastics to trial in ordinary civil courts. Compare this with quarrel in reign of Henry the First over investiture and homage. Prepare details of Becket's life and of the Constitutions of Clarendon.

The conquest of Ireland by Strongbow, Earl of Pembroke, and the quarrels between Henry and his sons afford ample material for study. The insurrections of Henry's sons were largely due

to the instigation of Louis the Seventh and Philip Augustus of France, whose policy it was to weaken the power of the English king by sowing dissensions in his kingdom. With the same political object Louis the Seventh supported Becket in his quarrel with the king. Philip Augustus did not gain much directly, although in supporting Richard against his father he managed to get possession of Tours, which commanded the valley of the Loire, and of Le Mans, which threatened Normandy and Brittany.

Richard the First's reign affords a good opportunity for studying the history of the Crusades, and students should read the *Story of the Crusades*, No. 40 in the Stories of the Nations (Fisher Unwin). Scott's *Talisman* should also be read about this time.

The reign of John marks the downfall of English power in France. Richard had been too able a warrior for Philip Augustus to make much headway against him, but with the accession of John there came a favourable opportunity for attacking the power of the English king in France. The neglect of the claims of Prince Arthur, and his untimely death, raised a storm of feeling against John, which Philip was not slow in turning to his own advantage. Ostensibly fighting in the cause of Arthur, the French king invaded Normandy, and captured Château Gaillard, a strong castle built by Richard to check any advance from Paris or Rouen. The castle was bravely defended by Roger de Lascy for six months; but John brought no help, and it was captured, March 1204. Induced by bribes from Philip, the leaders charged with the defence of Rouen, Arques, and Verneuil surrendered, and by the summer of 1205 Philip was master of Normandy, Brittany, Anjou, Maine, Poitou, and Touraine. Then his quarrel with the Pope prevented John from taking steps to reconquer the provinces his cowardice had lost. The details of this conflict with the Pope—Innocent the Third—are well known. Philip Augustus was only too willing to undertake to put into effect the Pope's bull for the deposition of John, and assembled a fleet and army at Damme, near Bruges. But John made his submission to the Pope, and Philip's fleet was destroyed by Lord Salisbury; and these two facts, especially the second, made Philip desist.

John then formed a coalition with several rulers to the north-east of France, including the counts of Flanders and Boulogne, and Otho the Fourth, Emperor of Germany. The plan of action was for John to invade France from the south, while his allies attacked from the north. John landed at La Rochelle in February 1214, and marched through Angoulême, and visited Limoges, and temporarily he re-established his authority in those parts. Philip then advanced against him, and compelled him to retire to the coast; but being obliged to go northward to meet the allies, he left his son Louis to keep John in check. John, however, crossed the Loire at Ancenis, captured Angers, and laid siege to a strong castle at Roche-aux-Moines. Here he was defeated by Louis (July 2, 1214), and his shattered army retreated to La Rochelle, and returned to England. Philip, on the 27th of the same month, completely defeated the allies at the celebrated battle of Bouvines. This battle may be regarded as one of the most important factors in the establishment of the French monarchy; and at the same time, by showing that John could not rely on foreign allies, it strengthened the hands of the English people in their struggle with John, as a result of which they gained Magna Charta.

The whole series of events leading up to the granting of Magna Charta, as well as the leading clauses of the document itself, should be carefully mastered.

With the help of the disaffected barons, Louis, the son of Philip Augustus of France, had invaded England; but on the death of John the barons returned to their allegiance to the throne, and the victory gained by the Earl of Pembroke over the Count of Perche at Lincoln, and the defeat of the French fleet, under Eustace the Monk, off Dover, soon made the French prince glad to accept terms and get back to France.

Note the administration of Pembroke, of Peter des Roches, and of Hubert de Burgh. The last is known to many only as the keeper of Arthur in Shakespeare's *King John*, and his real work in history is overlooked.

The constitutional acts of Simon de Montfort are generally well related in the text-books. They must be thoroughly mastered.

Prepare a detailed account of the Barons' War.

Geography.

Study the geography of France, Italy, Spain, and Portugal.

France.—Master the build of the country. Mountains in the east—Maritime, Cottian, and Graian Alps, between Italy and France; Jura, between France and Switzerland; the Vosges, between France and Germany. Notice the tablelands in the centre, with the peaks of volcanic origin—mountains of Auvergne and Forez; the tableland of Langres, in which the Seine rises, and that of Normandy, through which the river flows in its lower course. Study the rivers, the mineral wealth, and vegetable productions. The vine cannot be profitably grown north of a line drawn from Paris to the mouth of the Loire. Notice where the different kinds of wine come from—(*a*) Champagne, from the basin of the Marne, round Rheims and Epernay; (*b*) Claret, from the district round Bordeaux, especially between the Gironde and the Bay of Biscay: centres giving their names to varieties of claret—Medoc, St. Estèphe, St. Emilion, and Pauillac; (*c*) Sauterne, a white wine, from the same part: centre—Barsac; (*d*) Burgundy, from the valley of the Saone: centres—Macon, Beaune, and Beaujolais (the white wine from this district is called Chablis); (*e*) Saumur, from the valley of the Loire, between Tours and Angers. Bordeaux is the chief wine port, and hence the wines grown in the neighbourhood of Bordeaux are often called Bordeaux wines.

Brandy is produced in all the wine-growing districts, but the best comes from the Champagne district, and from Cognac, on the Charente.

The northern parts of France produce fruit, eggs, butter, and poultry. Wheat is produced in all parts.

Study in detail the manufactures.

Italy.—The physical features are easily mastered. Notice the position of the lakes.

For convenience of study, Italy may be considered as made up of two distinct parts—*continental* and *peninsular*. The continental part is a wide, fertile plain, bounded on the west and north by the Alps, and drained by the Po and its tributaries; in fact, in some parts it is correct to say that the plain is *watered* by the Po, for the river is higher than the adjacent fields, so that the water it brings from the mountains is used for irrigating the cultivated fields. Notice that Ticino, although Italian in its characters and population, forms one of the cantons of Switzerland. The great plain of Lombardy is by far the most important agricultural and manufacturing part of Italy. Cereals, rice, olive oil, poultry, eggs, butter, and cheese are sent in large quantities to England. The wheat is particularly fine and glutinous, so that it is fitted for the manufacture of macaroni, vermicelli, and "Italian paste." Silkworms are fed on the leaves of the numerous mulberry trees, and the silk and velvet produced in Turin and Genoa are very famous.

Some of the wealthiest cities of Italy, and cities which have played an important part in the history of Europe, are situated in this plain. Some of these towns are very strongly fortified, and, from their strength and position, are of great military importance.

The lakes were described in the July number of the *Practical Teacher*.

Since the cutting of the Mont Cenis and St. Gotthard tunnels, a great volume of overland trade has sprung up with France, Switzerland, and Germany. Trace carefully the course of the railways going through these tunnels, and particularly the one going on to Brindisi, as it is the line over which the Indian mails pass.

Spain and Portugal.—The physical features of the Iberian Peninsula are easily mastered with the aid of an atlas and sketch-maps. The mineral wealth is very great, but owing to want of energy is not very profitably worked by the Spaniards; some mines, such as the Rio Tinto copper mines, are worked by English and French companies. Agriculture is fairly important, and good grapes are grown. Oranges and fresh grapes are largely exported, and as the climate is much warmer and drier than in France the grapes are sweeter, and hence can be dried into raisins and muscatels, and produce sweeter and more alcoholic wines. The chief wines are—Sherry, so called from Jeres or Xeres, near Cadiz; Port, so called from Oporto, at the mouth of the Douro, whence it is exported; Malaga, Taragona, and Tent.

Arithmetic.

Study the section on vulgar fractions. This is extremely important. Prepare the proofs of the various rules and the graphic illustrations to be used in teaching them. Not only make yourself quite familiar with the whole of the theory, but look out for opportunities for putting the theory into practice. For example, most students know as a fact that the numerator and denominator of a fraction may both be multiplied by the same number without altering the value of the fraction, many also can prove the truth, but very few ever put this into practice. The converse is put into practice often enough in cancelling a fraction or bringing it to its lowest terms. A complex fraction, however, is most easily simplified by multiplying its numerator and denominator by the L.C.M. of all the denominators of the fractions which are found in it; for example,

$\frac{3}{4} - \frac{5}{12} + \frac{7}{16}$. Multiply numerator and denominator by 48, and $\frac{5}{6} + \frac{7}{8} - \frac{1}{2}$

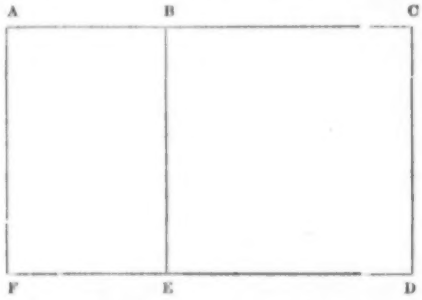
we obtain $\frac{36 - 20 + 21}{42 + 10 - 12} = \frac{37}{40}$; and although the intervening step is here written down in the explanation, yet the whole work of simplification can be done mentally, if done in this way. This method has such an advantage over the plan of adding and subtracting the terms in the numerator and denominator, and then inverting the denominator and multiplying the numerator by it, that we cannot understand why people do not adopt it.

Algebra.

Go to the end of factors, including their application to operations with fractions.

Euclid.

Revise the second book. Many students find this book very difficult, but the difficulty will disappear if only the student will recognise that he has two methods of describing a rectangular figure—one that we might call the *intuitional* (from Lat. *intueor*, I look on), because we describe the figure as we see it; the other, a method of denoting a rectangular figure in terms of the lines that form two adjacent sides. Thus the adjacent figure might be described as the figure ACDF, or as the rectangle AC·CD; while the right-hand part may be described as the figure BCDE, or as the square on BC; and the left-hand part, ABEF, is the rectangle contained by AB and BE. Since we are able to speak of a rectangular figure in terms of two of its adjacent sides, we can deal with squares and rectangles without actually drawing them. Again, since we must admit that anything is equal to the sum of all the parts of which it consists, we have no difficulty in proving the first eight propositions of the second book if we describe the figures and their parts by the intuitional method. Our advice, then, to students is to consider the figures intuitionally, and then describe them in terms of the lines which contain them.



Another source of difficulty in the second book lies in the apparent want of relation between the propositions. If the student uses the modern convention of counting lines measured in one direction as *plus*, and those measured in the other direction as *minus*, he will be able to trace some interesting relations between the problems, and also to deduce one proposition from another: thus, in the second proposition C falls between A and B, therefore both AC and CB are positive; but if C falls beyond B, then CB is negative, and the relation $AB^2 = AB \cdot AC + AB \cdot CB$ which is proved in the second proposition becomes $AB^2 = AB \cdot AC - AB \cdot CB$, which may be written $AB^2 + AB \cdot CB = AB \cdot AC$; which shows that the two propositions are in fact identical. Again, if the line AB is bisected in C, and D is any point in the line, then if D falls between C and D, we have by Prop. 5—

$$BC^2 = CD^2 + AD \cdot DB.$$

But if D falls beyond B, DB becomes negative, and the statement becomes—

$$BC^2 = CD^2 - AD \cdot DB,$$

or—

$$BC^2 + AD \cdot DB = CD^2,$$

which is the sixth proposition.

The ninth and tenth are similarly related, but since the square of a negative quantity is positive, the equation

$$AD^2 + DB^2 = 2AC^2 + 2CD^2$$

will apply either when D falls between C and B (Prop. 9) or when D falls beyond B (Prop. 10).

The difficulty in the twelfth and thirteenth propositions arises from the awkward way in which the rectangle has to be described in the enunciation. The student should examine this carefully, and he will see that no simpler expression can be found in terms employed by Euclid. If, however, we adopt the notion of projection, matters will become much plainer. If we drop perpendiculars from the extremities of a line on to another line, the portion of the second line intercepted between the perpendiculars is called the projection of the first line upon the second. If one extremity of the first line lies on the second line, it is necessary to draw only one perpendicular; so if a perpendicular be let fall from one angle of a triangle on to the opposite side (or that side produced), it will divide it internally (or externally) into two parts, which are respectively the projections of the other two sides upon it.

If the student has grasped this idea of the projection of one line upon another, he will not only be able to see the relation between the twelfth and thirteenth propositions, but will be able to include both under the following enunciation: "The square on one side of a triangle is equal to the sum of the squares on the other two diminished by twice the rectangle contained by one of those two sides and the projection of the other one upon it." Of course the sign of the projection must be taken into account: in the case of an obtuse-angled triangle the projection of the side is negative, hence we really *add* twice the rectangle; in the case of an acute angle the projection is measured in the other direction, and is positive. We can also include I. 47 in this statement; for in the case of a right-angled triangle the length of the projection is *nil*, and consequently the square on the hypotenuse is equal to the sum of the squares on the other two sides.

This enables us to throw the twelfth proposition into relation with the fourth, and the thirteenth proposition into relation with the seventh. Because if we take three points in the same straight line, we may regard the figure as a triangle in which the altitude is *nil*, or in which the two sides coincide with the base.

Elementary Science.

We have now to deal with the composition of matter, and we may begin by noticing that very few substances found in a state of nature are pure chemical compounds, and fewer still are pure elements.

We have seen that most substances can exist in three states, and the temperature at which they pass from one state to another is constant (provided that the pressure and other circumstances are the same). Now the simple experiment of boiling in a flask with a thermometer placed in the vapour just above the liquid will enable us to see that scarcely any liquid met with in nature is pure. The conversion of most solids or gases found in a natural state into liquids is not so easily brought about, and the calculation of the temperature at which the change takes place is attended with practical difficulties; but when it is effected, we find that the solids and gases we meet with in nature consist of mixtures of different bodies.

Very commonly the properties of bodies which are mixed together are so widely different that they may be easily separated. For example, take some gunpowder, shake it up in water, and after a time filter the fluid. A clear liquid will run through the filter, which may at first be thought to consist merely of water; but if the filter paper be carefully dried, it will be found that the black powder left behind weighs only about a quarter of the original weight of the gunpowder: evidently, then, something has dissolved and gone through with the water. If the water be carefully evaporated, a white crystalline solid will be left behind, which is nitre or saltpetre. The black residue, however, is not a pure substance; for if it be shaken up with a liquid called carbon disulphide and then filtered, on evaporating the clear carbon disulphide that has run through the filter, a yellow crystalline solid remains behind, which is sulphur. When all the saltpetre and sulphur have been extracted, a black powdery substance called carbon or lamp-black is left behind. If a solid is so mixed with a liquid that it passes through a filter with it, it is said to be dissolved, or in solution; it can be separated only by evaporating the liquid. Solutions are generally clear. If a liquid is not clear, it is probable that the solid in it can be separated by filtering; and if that is the case, the solid is said to be held in suspension. Mud is brought down by rivers in suspension, but the salt in the sea is in solution. If the solid in suspension is fairly heavy, or if there is no hurry, it may be allowed to settle, and the clear liquid be poured off. This process is called *decantation* (compare "decanter," the bottle into which wine is poured so as to leave the sediment behind). If two liquids are put in the same vessel, but do not mix, they may be separated by a tap funnel; for if they are poured into the funnel the heavier liquid will go to the bottom, and may be slowly run off, and as soon as the lighter liquid reaches the tap the latter is turned off. If a tap funnel is not available, an ordinary funnel may be used, the finger being placed at the bottom and partially withdrawn, to allow the heavy liquid to run out. Exercises may easily be arranged to afford practice in separating bodies.

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PHYSIOGRAPHY.

(ADVANCED AND HONOURS.)

Ice and Geology.—Recently Professor Edmund J. Garwood, M.A., Professor of Geology and Mineralogy to University College, London, delivered at Newcastle-on-Tyne the first of two lectures on "The Work of Ice as a Geological Agent." It was a known fact, said the professor, that glacial ice was continually in motion, but there were several theories put forward to account for its moving. Glaciers were created by the snowfields which became compacted by the percolation of water, and, being ice, it was supposed by one authority were kept in motion by the pressure of the snowfields above. But the head of the glacier moved faster than the centre, although the centre and tail of the glacier sustained a greater pressure. Professor Forbes had postulated the theory of gravity, while Professor Forell had put forward the most interesting theory of all. He had proved that glacial ice was made up of crystallized grains. These in the new ice at the head of the glacier were the size of a pea, while at the tail of the glacier they were sometimes as large as an orange. Certainly they increased as the age of the ice increased. Professor Forell's theory was that this increase was due to added water from percolation, and that the expansion of the glacial grains caused the motion. Several facts, however, helped to explode this ingenious theory—that the ice had been proved impervious to water at its own temperature, and that the glacial mass moved more rapidly where the grain was smaller than where it was large. In his opinion, the balance of testimony was in favour of the theory of gravitation, to which, of course, variation of climate had in a minor degree to be added. An interesting question in relation to the study of glacial phenomena was the fact that glacial ice retreated when it had reached the limit of its advance. This was established by the fact that several of the best-known glaciers in the Swiss and Austrian Alps had been perceptibly retreating for years. The question still engaged the attention of scientists, and no definite theory had yet been put forward to account for it. But Professor Brutner, who had proved that every thirty-five years there was a distinct change of atmospheric conditions, was inclined to the opinion that the glacial retreat or advance was coincident with the climatic cycle. He (Professor Garwood) could not accept this theory wholesale, because he knew of no case in which the advance and retreat of glacial ice varied periodically, but he had known cases where glacial advance had continued for fifty years, and retreat for a like period, followed by another advance, and Professor Brutner's theory, therefore, deserved the most practical investigation. A systematic observation of glacial alterations was now taking place all over the world, and the early results to hand went to prove that ice had its periodical outflow and inflow, much in the manner of a tidal river.

The Study of Solar Motion.—The D. O. Mills expedition of the University of California, sent by the Lick Observatory to spend two years in studying the motion of stars in the line of sight, has now arrived at Santiago. The object of the investigations which are to be carried on is to throw light on the great problem of the movement through space of our solar system. The expedition is headed by W. H. Wright, assistant-astronomer of Lick Observatory.

About a century ago Tobias Mayer found that in the region of Arcturus and Vega there is a slight separation of the stars. In the region of Sirius and Aldebaran, on the contrary, the stars approach. Mayer concluded that this apparent change was due to perspective, and that the sun and the planets which revolved around it were moving toward the region of Arcturus and Vega. Mayer's theories have been confirmed. The direction of motion was more easily determined than the velocity. After many attempts had been made, Professor W. W. Campbell, of the Lick Observatory, adopted a very ingenious method which gave valuable results.

When a luminous body which is moving away from the observer is examined in a spectroscope, the lines which appear in its spectrum will be shifted out of their true position in one direction, but are moved to the other side if the body is approaching the observer. Similar effects are observed if the body be stationary and the observer's position changes. The degrees of displacement of the lines enable one to determine the rate of motion in the line of sight.

An especially powerful spectroscope was constructed, with the aid of which the velocity of the solar system was determined. Professor Campbell, after having studied the motions of some 283 stars, concluded that the sun was moving at the rate of twelve miles a second. A continuation of the studies has not led him to alter the conclusion which he has reached.

At Mount Hamilton, where Professor Campbell studied solar motion, the astronomical field is comparatively limited. Many portions of the southern heavens can never be seen at all. In order, therefore, to determine with absolute accuracy the velocity of the motion of the solar system, it was necessary to study the motion of the stars in the southern hemisphere. It is for this purpose that the D. O. Mills expedition has been dispatched southward. Of the instruments which have been taken along, the most important is a reflecting telescope made by Brashear. Its aperture is over 36 inches. Its focus is 17½ feet from the concave mirror. About two years will be spent in studying the stars in the southern hemisphere.

The Pacific Floor.—The Hon. W. E. Meehan gives some interesting particulars of the recent Pacific soundings of the U.S.S. *Albatross*. The floor of the Pacific on the plateau levels is mainly level, with an average depth of from 2,800 to 2,900 fathoms. The soundings made a hundred miles from the island of Guam in the Moser Basin and the Tonga-Kermadec Deep gave record depths—the former being 4,813 fathoms, or 28,878 feet; the latter 4,540 fathoms, or 27,240 feet.

At these great depths the water was, as is usual, extremely cold, the temperature of the Moser Basin being 35° F. In the majority of instances the temperature at depths of 3,000 fathoms and upwards ranged from 35° F. to 39° F.

The floor was found to be formed for the greater part of the well-known red clay, which, however, was covered up here and there by the various kinds of abysmal oozes—namely, globigerina, white radiolarian (with which large areas were found to be covered), and pteropod, diatom, terrigenous and coral in smaller areas.

But by far the most interesting ocean-floor deposits were the enormous finds of manganese, in the form of nodules and discs—the former varying in size from a pea to a cannon ball, the latter varying from the size of a sixpence to that of a good-sized dinner plate. The surface of all these specimens was dirty brown in colour and deeply indented. Thousands of square miles of the Pacific floor were found to be paved with these metallic deposits. In fact, it is believed that they extend from Guam to the shores of Tahiti, and it is certain that other regions are also covered with these nodules and discs.

When broken open the metal is found thickly veined and almost pure, and one point of interest disclosed by the opening of both nodules and discs is that the metal is always deposited round a nucleus, which is very various in character. It is difficult to account for these oceanic manganese deposits. One suggestion is that the stones were carried by glaciers during the ice age, and another that they were cast out by terrific eruptions of prehistoric volcanoes.

Solar Energy and Radium.—Writing to *Nature* of July 9th,

READY AUGUST 25th.

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Mr. W. E. Wilson suggests that as radium has the property of radiating heat without itself cooling down to the level of surrounding objects, the heat of the sun may be due to the presence therein of a certain proportion of radium, and he calculates that, taking the statement of M. and Mdme. Curié that one gram of radium can supply 100 calories per hour, the presence of 3·6 grams of radium per cubic metre of the sun's volume would suffice to give out the 828,000,000 calories per square centimetre per hour, which is Langley's estimate of the sun's heat radiation.

New Rays.—The *Journal de Physique* contains two short papers by M. R. Blondlot on a new kind of light obtained originally after filtering the rays from a focus tube through aluminium or black paper. In studying the action of the radiations on an electric spark, they were shown to present the phenomena of rectilinear polarisation, and it was further found that both quartz and sugar produced rotatory effects. On passing the rays through a plate of mica, double refraction took place; finally, the existence of refraction was proved by concentrating the rays with a lens, and reflection was also observed. It followed that the radiations were entirely different from Röntgen rays, and must be attributable to a new kind of light. In the second paper in the July number, M. Blondlot finds that radiations possessing identical properties are obtained from an Auer lamp, and that the new rays will pass through certain metals and substances which are opaque to the radiations discovered by Professor Rubens.

Sun's Parallax from small Planet Observation.—Mr. Lynn, writing on this subject in the journal of the Royal Astronomical Society, says that the first planetoid to be used for this purpose was Flora, by the use of which Galle in 1875 estimated a solar parallax of 8·89″.

In 1877, Gill found the parallax to be 8·77″, Juno being the planetoid used. From the use of the planetoid Victoria in 1897, Sir David Gill found a parallax of 8·80″, and Mr. Auwers 8·82″. In the same year the same observers, with Sappho as the planetoid of reference, found a parallax 8·80″ and 8·63″; and finally, Dr. Elkin and Mr. Auwers in 1897 found the figures to be 8·81″ and 8·77″. The simple mean of all these determinations is 8·77″, which Mr. Lynn believes to be a very close approximation, if not the exact parallax itself.

CHEMISTRY.

(ADVANCED AND HONOURS.)

BY T. CARTWRIGHT, B.A., B.SC.

The Combination of Hydrogen and Chlorine under the Influence of Light (P. V. Bevan).—The first point studied in this investigation was the initial expansion, or Draper effect, when light is allowed to fall on a mixture of hydrogen and chlorine. This expansion was shown to be due to heat developed by the combination of the hydrogen and chlorine to form hydrochloric acid. The heat effect was measured by the change in resistance observed in a fine platinum wire sealed through the bulb in which the gas mixture was exposed to light. The investigation then considers the period of induction of Bunsen and Roscoe, and the effects of various intensities of light on the rate of combination. Experiments were also made on the effect of illuminating chlorine before mixing with hydrogen, and the original observation of Draper—that the combination takes place more readily after this pre-illumination—was confirmed. If, however, the gases be bubbled through water after pre-illumination of chlorine, this effect is destroyed, and the gases behave like the ordinary mixture. To obtain evidence of an intermediate compound, the gases were submitted to sudden expansion producing supersaturation. When the gases were dust free, a nucleus-forming substance occurred after illumination, so that on the expansion a cloud was formed when the supersaturation reached a certain amount. In the non-illuminated gas mixture no cloud-producing substance could be observed with yellow light. This cloud is produced in chlorine alone. In the mixture of hydrogen and chlorine the cloud appears before any hydrochloric acid is formed. The theoretical part of the paper considers the action as taking place in three stages—combination to form complex molecules containing hydrogen, chlorine and water molecules occurring, and then a breakdown of this complex system giving hydrochloric acid and water. The view thus taken explains the chief features of the induction period, and can be extended to apply to other similar actions where a catalyser is necessary for the progress of the action.

Experimental Determination of Equivalents (John Bridgeford Coppock, F.I.C., F.C.S.).—This method consists in using the inner tube of a Lothar Meyer's vapour-density apparatus. It lends itself to a lecture-table method of determining the equivalents and illustrating respectively the mono-, di-, and tri-valency of sodium, magnesium, and aluminium. The apparatus is fitted up as for a vapour-density determination, with the omission of the outer tube.

Method: For Sodium.—Use a small weighing bottle or a corked test-tube. Quickly cut and dry a small piece of sodium, introduce it into the weighing vessel, and weigh again. This weighed quantity of sodium is allowed to fall down the experimental tube into methylated spirits or a mixture of alcohol and water. The hydrogen is slowly evolved, and is collected in the graduated gas tube.

For Magnesium.—A small piece of bright metal, after weighing, is dropped down the experimental tube into dilute hydrochloric acid. If commercial magnesium be used, the amount of carbon in it will introduce an error.

For Aluminium.—Commercial aluminium may be used. A small quantity is weighed out and dropped into strong hydrochloric acid in the experimental tube. Acid in the proportion of ten volumes of acid to one of water is a convenient strength.

RESULTS.

Weight of metal introduced.	Volume of hydrogen liberated at 10° C. and 750 mm.	Corrected volume.	Equivalent found.	Standard equivalent.
Grm.	C.c.	C.c.		
		Sodium.		
0·078	39·4	37·5	23·21	23
0·074	37·2	35·4	23·32	23
		Magnesium.		
0·0505	48·2	45·88	12·28	12·15
0·0457	43·7	41·66	12·26	12·15
		Aluminium.		
0·0326	42·5	40·46	8·99	9·03
0·0350	45·4	43·22	9·04	9·03

—*Chemical News.*

Notes on Ozone (J. K. H. Inglis).—Experiments have been made in order to ascertain the molecular state of ozone when dissolved in acids. In the first place, it was found that the amount of ozone present in an acid solution could be determined by means of the following reaction:—$O_3 + 2HBr = Br_2 + O_2 + H_2O$, the bromine liberated being estimated by potassium iodide and sodium thiosulphate.

In the second place, an investigation of the solubility of ozone in water showed that the solution could not be brought into equilibrium with respect to the gas, since some of the latter was always decomposed on being bubbled through the solution, although the concentration of the latter remained constant. Hence the molecular state cannot be ascertained by means of the solubility relationship.

Lastly, some experiments made on the action of ozone on hydrogen peroxide indicated that these substances acted slowly on one another, manganous sulphate behaving as a catalyser.

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*** As preliminary to an attempt at constructing a Science of Literature, the author criticises the two most influential theories of literary æsthetics of the last fifty years.

experiments, Sir Oliver Lodge points out that the atoms thrown off from a radio-active substance are not atoms of the substance itself, but belong to a different body, possessing a very much lower atomic weight. The emanations leave behind them in the pores of the radium a sort of heavy gas, again a different element, which is itself unstable, and sends out radiations of its own. Thus the radium is being slowly split up into a "chain of substances" in a descending scale of atomic weights, different elements, which bear a relation to their parent. The inconceivable smallness of the products of this disintegration prevents their being followed and analysed. But it also suggests that the same kind of breaking-up may be going on in other elements, on a scale too small for observation. Many of the chemical elements form groups related in their qualities and showing a sort of progression in their atomic weights, which might suggest that they are the results of such disintegration, and under various cosmic conditions have settled down into their present apparent stability. "The recognised elements which we know so well must clearly be comparatively stable and persistent forms, but it does not follow that they are infinitely stable and perpetual; the probability is that every now and then, whether by the shock of collision or otherwise, the rapidity of motion necessary for instability will be attained by some one atom, and then that particular atom will fling off the fragment and emit the rays of which we have spoken, and begin a series of evolutionary changes of which the details may have to be worked out separately for each chemical element."

The Light of the Glowworm.—In Sir Oliver's view the atom is not simple, but complex: it is composed of an aggregate of smaller bodies in a state of rapid interlocked motion, restrained and coerced into orbits by electrical forces. An atom is fairly stable, but not eternal. Every now and then one atom in a million, or rather in a million millions, gets into an unstable state, and is then liable to break up. A very minute fraction of the whole number of the atoms of a substance do thus actually break up, probably by reason of an excessive velocity in some of their moving parts; an approach to the speed of light in some of their internal motions—perhaps the maximum speed which matter can ever attain—being presumably the cause of the instability. In this cosmic process, the gradual break-up into simpler forms of a complex arrangement built up untold ages ago, Sir Oliver suggests that the glowworm and firefly are perhaps using the energy of the world's break-up to produce their light. The light of the glowworm, he says, is accompanied by "a trace of something which can penetrate black paper and affect a light-screened photographic plate," and he asks, "Has the insect learned how to control the breaking-down of atoms so as to enable their internal energy in the act of transmutation to take the form of useful light instead of the useless form of an insignificant amount of heat or other kind of radiation effect?"

Chemical Affinity at Low Temperatures.—In experimenting at low temperatures, two difficulties are experienced. In the first place, the moisture from the air condenses and forms a layer of ice round the body to be experimented upon, and so protects it from the reagent; and secondly, insoluble substances frequently result from the reaction, which also form a protective layer. In experimenting with liquid fluorine at $-187°$, the carefully-dried substance was placed in a sealed glass tube at $-190°$, and was afterwards broken inside a crystal tube containing liquid fluorine. Notwithstanding the fact that iodine and fluorine react with great energy at ordinary temperatures, flame being as a rule a result of the reaction, there is no reaction between the two substances at $-187°$. A mixture of oxygen and fluorine (both liquid) can be separated by distillation. Sulphur burns with a blue flame in liquid fluorine, sulphur hexafluoride being formed. With tellurium and nitrogen there is no reaction. Red phosphorus combines with liquid fluorine to form PF_5. Arsenic burns violently with a blue flame when put in contact with the reagent. With antimony there is no reaction, as is also the case with the different varieties of carbon, with crystalline silicon, and amorphous boron. With wood charcoal and soot a reaction takes place, the substances becoming incandescent. Sodium keeps its lustre, but is surrounded by a transparent layer of liquid sodium fluoride. With potassium, at first there is no action, but after a few seconds the bodies combine with explosive force. Arsenious oxide, silica, and boron anhydride are not attacked, and the same applies to calcium carbide. Lime, on the contrary, is attacked with such violence as to shatter the apparatus.

Ammonia and Phosphorus.—When yellow phosphorus is heated above its melting-point with excess of liquid ammonia, a fine black powder, containing phosphorus, nitrogen, and hydrogen, is formed. The powder turns an intense orange-red in moist air, the change occurring much more quickly in the presence of acids; the black colour is, however, regenerated by the addition of more ammonia. It is supposed that the black powder is P_3NH_2, and the red body P_4O.

Hypophosphorous Acid.—This acid, the preparation of which has in the past presented considerable difficulty, may now be easily prepared by vigorously shaking together phosphorous acid and phosphorous trichloride, the latter in excess, at a temperature of from 30° to 40°. The clear liquid thus obtained may also be got by passing CO_2, saturated with the vapour of phosphorous trichloride, into a paste made by moistening the trichloride with water. The liquid placed over P_2O_5 and KHO in a desiccator, solidifies to crystals, which are very deliquescent, and melt at 38°. When moistened with water, the acid instantly is converted into phosphorous acid. Upon heating to 100° it becomes yellow, and at 130° PH_3 is evolved.

NOTES AND JOTTINGS.

THE TEACHERS' REGISTER.—A circular has just been issued by the Board of Education setting out three modifications in the rules for keeping the register:—(*a*) For the one year's training may be substituted "periods amounting altogether to not less than one year under circumstances which, in the opinion of the registration authority, render the periods equivalent to a continuous year;" (*b*) so in Section 4 (i) for three years' experience may be substituted "for periods amounting altogether to not less than three years under circumstances which, in the opinion of the registration authority, render the periods equivalent to a period of three years next preceding his application;" (*c*) and the registration authority may place on Column B the name of any person who does not fulfil all the conditions of registration, not only if in their opinion he has proved himself to be an exceptionally qualified teacher, but merely if he "has had experience extending over a period of not less than ten years of teaching (other than teaching in an elementary school or teaching of a purely elementary character), and has in their opinion shown ability to teach." This last phrase seems to us to be an extremely elastic phrase, and it looks as though an effort will be made to put teachers on the register with very slender claims.

THE CHILD'S CIRCLE OF THOUGHT.—A few weeks ago a Scotch inspector reported that he had visited a school in which the pupils had never seen a horse or a road. The following letter has been sent to the *Educational News* from the Hebrides, and shows that the particular school is really typical of a large class:—

"SIR,—As doubt seems to have been cast on 'Inspector's' statement regarding scholars never having seen a horse, I enclose some facts regarding the Lewis school over which destiny has placed me.

"There are 107 pupils in Planasker School. Of these only 46 have ever seen a horse, six out of the lot have seen a plough, while only one has seen a pig. Not 40 per cent. have seen a decent-sized tree, and there are no roads here.—I am, etc.,

"WM. KERR."

THE EVOLUTION OF THE ENGLISH DICTIONARY.—Lecturing on dictionaries at the Royal Institution, Dr. J. A. H. Murray stated that in the year 1604 was published the first attempt at a purely English dictionary, the *Table Alphabeticall*. The first book with the title of *An English Dictionary* was published in 1623. These works were mainly compiled for the use of "women and other unskilfull persons." In the year 1721 appeared the first attempt at a complete dictionary of the English language, remarkable also for the introduction of the etymological treatment of words—that of Nathaniel Bailey. The special feature of Dr. Johnson's dictionary, based on this, was the quotations, all gathered by Johnson himself and copied by six assistants. They were printed without verification or reference, and the proofs were not carefully read; hence many curious errors—the confusion, for instance, of coco with cocoa or cacao. The first marking of the pronunciation of words was due to Dr. W. Kenwick in 1791. With regard to the *Oxford Dictionary*, Dr. Murray explained that two thousand readers all over the world helped, one hundred thousand volumes were laid under contribution, and six million quotations, weighing six tons, were received. It was found that some words really had no existence, and though put in former dictionaries were merely printers' errors. A case in point was found by himself. In one of Stevenson's books he found "charnel brean." He could not understand it, and wrote to the author, who in reply said he had never corrected the proof, and that the real words were "charnel ocean."

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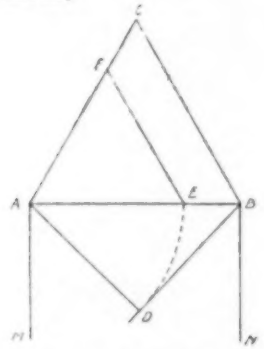
The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Syneros.—Bisect an equilateral triangle by a straight line drawn parallel to one of the sides. (Proof to be restricted to Euclid, Books I. and II.)



Let ABC be the given equilateral triangle. At AB draw AM, BN at right angles to AB. Bisect the angles MAB, ABN by AD, BD, intersecting in D. Then ADB is a right angle (Euclid I. 32).

Now, by a well-known deduction from Euclid, Book I., the equilateral triangle described on AB is equal to the sum of the equilateral triangles described on AD, DB. (See Nixon's *Euclid Revised*, Book I., Exercise 64.)

But AD = DB (Euclid, I. 6). Therefore the equilateral triangle on AD is equal to half the triangle ABC.

From AB cut off the part AE equal to AD, and draw EF parallel to BC. Then each of the angles of the triangle AEF is equal to one of the angles of an equilateral triangle. Therefore the triangle AEF is equilateral.

Again, since AE is equal to AD, therefore the triangle AEF is equal to the equilateral triangle on AD.

Hence the triangle AEF is half the triangle ABC.

Bat.—Indicate the method of finding the general equation of a conic section which has double contact with a given parabola.

Find the equation of a conic which passes through a given point and touches a given parabola at the vertex and at one extremity of the latus rectum. What is the condition that this conic may be an hyperbola? (London B.Sc.)

For the first part see Loney's *Co-ordinate Geometry*, §§ 380, 384, and 385.

Let $y^2 = 4mx$ be the equation referred to rectangular axes of the given parabola, the vertex being the origin, the tangent at the vertex the axis of y, and $4m$ the parameter. The line joining the vertex and the extremity of the latus rectum is the line joining the points $(0, 0)$, $(m, 2m)$; its equation is therefore $y - 2x = 0$.

Now, in the articles referred to above it is shown that any conic which touches the parabola $y^2 - 4mx = 0$ at the points $(0, 0)$, $(m, 2m)$, has for its equation—

$$y^2 - 4mx - \lambda(y - 2x)^2 = 0 \quad . \quad . \quad . \quad (1)$$

Let (α, β) be the given point. Then since (1) is to pass through this point, we must have—

$$\beta^2 - 4m\alpha - \lambda(\beta - 2\alpha)^2 = 0.$$

$$\therefore \lambda = \frac{\beta^2 - 4m\alpha}{(\beta - 2\alpha)^2}.$$

Hence (1) may be written—

$$(\beta - 2\alpha)^2 (y^2 - 4mx) - (\beta^2 - 4m\alpha)(y - 2x)^2 = 0 \quad . \quad (2)$$

Equation (2) is therefore the required equation, for it represents a conic which passes through the given point (α, β), and touches the given parabola $y^2 = 4mx$ at the vertex and at one extremity of the latus rectum.

Expanding the third term in (1), the equation may be written—

$$-4\lambda x^2 + 4\lambda xy + (1 - \lambda)y^2 - 4mx = 0 \quad . \quad . \quad (3)$$

Now the general equation, $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$, represents an hyperbola if $h^2 > ab$; hence (3) is an hyperbola if $4\lambda^2 > 4\lambda(\lambda - 1)$—that is, if $\lambda > 0$.

But $\lambda = \dfrac{\beta^2 - 4m\alpha}{(\beta - 2\alpha)^2}$; therefore (2) is an hyperbola if $\beta^2 - 4m\alpha > 0$. Hence the required condition is that β^2 shall be greater than $4m\alpha$.

Arum.—Find which is the greatest term in the binomial series $x^n + nx^{n-1}(1 - x) + \dfrac{n(n-1)}{1 \cdot 2} x^{n-2}(1 - x)^2 + , \ . \ . \ .$ and show that when $n = 10$ and $x = \frac{2}{5}$ the value of the greatest term is very nearly 0·25.

The given series may be regarded as the expansion of $x^n\left\{1 + \dfrac{1 - x}{x}\right\}^n$. Let $\dfrac{1 - x}{x}$ be denoted by y.

Now in any standard treatise on algebra it is shown that if the r^{th} term of the series $(1 + y)^n$ is the greatest, then r is greater than $\dfrac{n + 1}{y + 1} \cdot y$, and less than $\dfrac{n + 1}{y + 1} \cdot y + 1$.

Hence if the r^{th} term of the given series is the greatest term, we must have—

$$r > \frac{n + 1}{\dfrac{1 - x}{x} + 1} \cdot \frac{1 - x}{x}; \text{ that is, } r > (n + 1)(1 - x);$$

and $r < \{(n + 1)(1 - x) + 1\}$. Therefore if the greatest term of the given series is called the r^{th} term, r must lie between $(n + 1)(1 - x)$ and $(n + 1)(1 - x) + 1$.

Now, if $n = 10$ and $x = 0{\cdot}4$, r must lie between $(10 + 1)(1 - 0{\cdot}4)$ and $(10 + 1)(1 - 0{\cdot}4) + 1$—that is, between 6·6 and 7·6. But r must be an integer, therefore $r = 7$.

Hence the 7^{th} term of the series is the greatest term, where n and x have the values given in question.

The 7^{th} term is then expressed by $\dfrac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5 \cdot 6} x^{10-6}(1 - x)^6$; that is, by $210 \times (0{\cdot}4)^4 \times (0{\cdot}6)^6$; that is, by 0·2508. . . .

Therefore, when $n = 10$, and $x = \frac{2}{5}$, the value of the greatest term in the given binomial series is very nearly 0·25.

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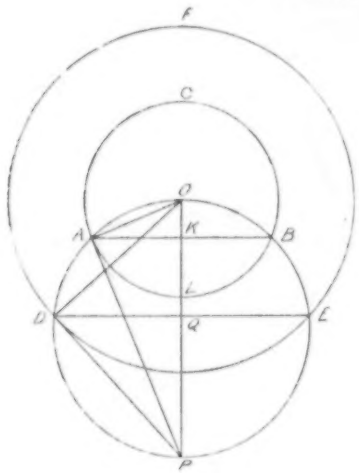
Bike.—Two fixed concentric spheres are cut by a third sphere which passes through their common centre. Show that the area of the spherical zone intercepted between the two concentric spheres is independent of the radius of the third sphere.

(Stage 4, 1902.)



Let the plane of this page be supposed to pass through O, the common centre of the fixed spheres, and also through Q, the centre of any third sphere which passes through O, and let the circles ABC, DEF, DEO be the intersections of the spheres with the plane of the page. Then the chords AB, DE are the diameters of the circles in which the third sphere intersects the two fixed spheres. Let OQP be that diameter of the third sphere which passes through O, and let AB, DE cut this diameter in K, L. Then KL is the height of the spherical zone intercepted between the two fixed spheres. Join AO, AP, and DO, DP.

Now if OL = H, and OK = h, the area of the zone of the third sphere intercepted between the first two is given by the expression $2\pi\rho(H - h)$, where ρ is the radius of the third sphere. But H = R cos DOL where R is the radius of the outer of the fixed spheres, therefore $H = R \cdot \frac{R}{2\rho}$. Similarly, if r denote the radius of the inner fixed sphere,

$$h = r \cdot \frac{r}{2\rho}.$$

$$\text{Hence } H - h = \frac{R^2 - r^2}{2\rho}.$$

Therefore the area of the intercepted zone is given by—

$$2\pi\rho \cdot \frac{R^2 - r^2}{2\rho}, \text{ or } \pi(R^2 - r^2);$$

and this last expression is independent of the radius of the third sphere.

Limbo.—Find within what limits the values of x must be when $x^2 - 7x + 12$ is negative. Find, also, within what limits x must be when $\frac{x-1}{6-x}$ is positive. Verify your answers by substituting $x = 3{\cdot}75$ in each expression.

$$x^2 - 7x + 12 = (x - 3)(x - 4).$$

Hence x must be greater than 3 and less than 4 if $x^2 - 7x + 12$ is negative.

If $\frac{x-1}{6-x}$ is positive, then $(x - 1)$ and $(6 - x)$ are either both positive or both negative. Hence x must be greater than 1 and less than 6.

$$\text{If } x = 3{\cdot}75, \text{ then } (x - 3)(x - 4) = (0{\cdot}75)(-0{\cdot}25) = -0{\cdot}1875.$$

$$\text{Again, if } x = 3{\cdot}75, \text{ then } \frac{x-1}{6-x} = \frac{2{\cdot}75}{2{\cdot}25} = +\frac{11}{9}.$$

A. E. J.—The best books we can think of for your purpose are (1) *Chemists and Their Wonders*, by F. M. Holmes, published by S. W. Partridge and Co.; and (2) *Chemistry in Daily Life*, by Larsar Cohn, published by H. Grevel and Co.

Bike.—Show (by methods of dimensions or otherwise) that under a restoring force proportional to the n^{th} power of the displacement the period varies inversely as the $\frac{1}{2}(n-1)^{th}$ power of the amplitude.

The formula for simple harmonic motion may be written in the form

$$M\frac{d^2s}{dt^2} = -ks^n,$$

where s denotes the displacement at time t—the negative sign indicating that when the direction of the displacement is to the right that of the acceleration is to the left, and conversely.

If T denotes the periodic time, then, as s denotes a length, the equation in dimensional form may be written

$$\frac{ML}{T^2} = -kL^n,$$

$$\text{or, } \frac{M}{T^2} = -kL^{n-1}.$$

$$\therefore T = \sqrt{\frac{M}{kL^{n-1}}},$$

$$\text{or, } T \propto \frac{1}{L^{\frac{1}{2}(n-1)}}.$$

Replies to the following queries will appear in our next issue:—*Ba', Discan, E. C. Park, E-k, Boz, Scotty, Fr X.*

A Typist's Newspaper.—We understand that arrangements have been made by Mr. Guilbert Pitman to commence publication on 1st October next of a new penny monthly magazine, entitled the *Typist's Review*. According to the particulars which have been supplied to us, the *Typist's Review* will aim to be a newspaper in the interests of typists generally, and will contain the latest news, from special correspondents in all parts of the world, of all that goes on interesting to the profession. Critical accounts of all new machines, and all appliances, etc., accessory thereto, reports of society and other meetings, personal paragraphs, interviews with leading members of the profession, articles on all new office methods and devices, etc., will be fully dealt with.

National Competition of Schools of Art, Evening Schools, and Day Classes, 1903.—The works submitted for this competition are now on view at South Kensington, and make a very fine show. Nearly six thousand works were entered for the competition, and after careful scrutiny by a very competent board of examiners, there were awarded four gold medals, sixty-nine silver medals, a hundred and ninety-seven bronze medals, and nearly four hundred book prizes. The Princess of Wales's Scholarship of £25 and a gold medal were awarded to Miss Edith Mason of Taunton for a design for a lace zouave. The Princess of Wales's Scholarship of £11 and a gold medal were awarded to Miss Sarah C. V. Jarvis of Battersea Polytechnic for some designs for printed muslin; and the other two gold medals were gained by Miss Edith Linnell of Birmingham and Mr. Fred Halnon of New Cross. Thirteen silver and twenty-two bronze medals were gained by students from Birmingham School of Art; while Hanley obtained five silver and two bronze.

The quality of the work sent in seems quite up to the average, and in some sections above the average. Some good specimens of modelling were sent in, and we should like to call attention to "Narcissus," a really excellent piece of work, though somewhat small. The best work, as one would naturally expect from schools which aim at the application of art to industry, is in the sections devoted to designs. Some of the designs for lace are extremely beautiful; and among the other designs there is, as a rule, close attention paid to the relation between the design and the material in which it is to be executed.

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THE EDITOR'S TABLE

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Some Useful Animals. This book is both interesting and instructive, but the American spelling is a drawback to its introduction into English schools.

Beginnings of Rhetoric and Composition. By A. S. Hill, Boylston Professor of Rhetoric and Oratory in Harvard University. The author, who has in mind the needs of pupils in secondary schools, seeks to remove, by this very full treatise on English composition, the difficulties which lie between thought and expression. He proceeds by example and exercise. Many of the doubtful forms of expression dealt with are peculiarly American, and the book is therefore somewhat unsuitable for class use in English schools. All teachers of composition will, however, find it of very great service, partly on account of the excellent selection of passages chosen from our best writers to illustrate correct forms and serve as models of style, and partly because of the abundance of carefully-framed exercises.

Barnes' School History of the United States. By Joel Dorman Steele, Ph.D., and Esther B. Steele, Lit.D. We have here what may truthfully be called a magnificent work, and to review it at such length as it deserves would entail our giving more space than we can afford. It is a revision of the book which for upwards of thirty years has been the standard history of the United States. The compilers have achieved a remarkable success. They have brought to us in England, in a highly commendable form, what would take many hours of wearisome search in dull records. From the time of the early discoveries of the continent down to the Philippine Government Act of July 1902, nothing of importance tending to the building up of the Republic has been omitted. The Spanish, French, English, and Dutch explorations, and the contentions which arose between these nations, form the first epoch of the narrative. From these the reader is made acquainted with the development of the English colonies, and the causes and events which led to the American Revolution and the establishment of an independent government. One next sees how the States are managed under the administration of the various leaders, from Washington to M'Kinley, and interspersed between government records is to be found matter of a most interesting nature, and relevant to the points at issue. Indeed, the whole history is as inviting as the best literature one can remember to have read. Illustrations and tabular matter are frequently used, the former to make clear and the latter to make easy a recapitulation of the history. Collateral readings are also noted, and a valuable appendix containing the Declaration of Independence, the Articles of Constitution, questions for class use, and a Table of States, with useful supplementary matter, brings a delightful book to an end. We put it down, not to rest—for the reading has not been wearisome—but with the knowledge that the study of so important a history, so delightfully written, will make the English readers of it admire the heroism of their cousins across the sea, who fought, and bled, and died for the establishment of the liberty of self-government which we hold so dear.

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Nature Drawing Book. By the same hand as the last, this small work contains twenty-four copies in black and white on simple flower and leaf forms, and affords a pleasant change from the ordinary copy, and a preparation for the more valuable drawing from nature itself.

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France de Montorel. By Jules de Glouvet. This little book is a historical novel founded upon the Hundred Years' War. The editor, Mr. F. B. Kirkman, has abridged it, and his admirable notes, both in French and in English, make it a very suitable book for the more advanced schoolboy. The use of notes in French, and of pictures to aid the imagination, will be greatly appreciated by those who follow the "direct" method of language teaching. The book may be had either with or without English notes and vocabulary.

Le Roi des Montagnes. Première Partie. Edited by F. B. Kirkman. It seems a great pity to cut such a work in two merely because the examiners of the Cambridge Local Examinations, while recognising the suitability of the book for class reading, have decided that it was not advisable to require the whole book to be prepared for the next examination. The illustrations form an important feature in this edition, and in general they have caught the humour of the novel. The flower depicted on page 87 is, however, not the *Boryana variabilis*, and differs in nearly every point from the description given at the side. There are some sets of questions on the text given in French for the benefit of teachers who have a difficulty in conducting conversations on the passages read. There are twelve pages of notes, which are short but serviceable, but there is no vocabulary.

A Legend of Montrose. With introduction and notes by Arthur T. Flux. Mr. Flux's abilities as an annotator are so well known to our readers, that we need only say that he has done everything that could be done to assist either the student or the general reader in the enjoyment of Scott's brilliant novel. We would draw attention to a slight slip on page ix., where the Short Parliament is stated to have been summoned as a result of the defeat at Newburn. Evidently the Long Parliament was here intended, not the Short Parliament, as the latter sat from April 13 to May 5, and Newburn was fought August 28.

Illustrated Term Readers. Under this title Messrs. A. and C. Black are publishing some handy little French reading books. They are arranged in three grades. The first set, being intended for elementary pupils, is provided with a vocabulary at the end of each volume; the second and third sets have no vocabularies. The materials are for the most part well selected, and suited to the classes for whom they are intended, although we think that a book that requires so much expurgation as *Zadig* is best left alone. Each book contains enough matter for a term's work; so, naturally, the books for advanced forms contain more than the elementary. Each book is adequately supplied with English notes, and in addition there are frequent explanatory footnotes in French, which we consider a good feature.

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Pierre et Camille. By Alfred de Musset. Edited by W. G. Etheridge, M.A. We can hardly congratulate the editor on his selection of this work for school use. There is very little of interest in the story, and the long descriptions of the

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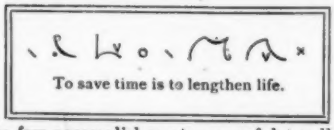

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sources of the country. The object of this issue is to afford reliable information to intending emigrants and investors of capital, but it is of equal value to all students of geography, especially of commercial geography. Even a cursory examination of the map is sufficient to impress one with the extent of one's ignorance regarding this great and growing republic, while a further study of it should do much to dispel this ignorance.

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The Nature Study and Freearm Drawing Series. Part II. of the books, cards, and demonstration sheets has now been issued. We commented very favourably upon Part I. a short time ago, and the present set is equally commendable. The examples are well and carefully drawn, and are selected to illustrate various phases in natural growth.

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Cornelius Nepos. Vol. II. By H. Wilkinson, M.A. This second volume contains the lives of Greek men of note, Epaminondas being the best known of the eight. The vocabulary is more extended than usual, and the editor has aimed at destroying the common error of young pupils that each Latin word has one and only one rendering in English.

Quintus Curtius Rufus. Book VIII. (Chaps. IX.–XIV.) By C. J. Phillips, M.A. Alexander the Great's invasion of India is the subject of the section which Mr. Phillips has edited. The identification of the localities by Indian authorities, and the comparison of the religious ideas and customs of the Indian races as set forth here with those actually existing, is a strong feature of the work. The book may be recommended for use in elementary classes to teachers wanting a change from Cæsar.

Macmillan's Story Readers. Books I. and II. By Evelyn Sharp. These books are strikingly beautiful. In addition to their containing interesting and bright reading matter, they are illustrated by pictures from photographs. Book I. contains the continuous story of a little girl named Suke. She is childlike in nature, and her quaint little ways and good sense will appeal to the children who may be fortunate enough to make her acquaintance in the reading lesson. There are also other interesting pieces, those about "the little town girl and the country boy" being instructive and fascinating. In Book II. the reading matter is more varied, but much the same features are noticeable. The photographs are the result of infinite labour, and they are exceedingly apropos to the lessons.

New History Readers—Primary. To suit the capacities of children of about eight or nine years of age, the most interesting stories of our own history have been written for this issue. We have pleasure in expressing our opinion that the idea has been well carried out. Except for names and a few hard words here and there which are entirely unavoidable, the lessons, or stories, are within the range of such children, and the book will supply the want that has been felt by many teachers who have wished to include historical stories in their instruction.

Object Lessons in Geography. By Vincent T. Murché. This book might be called a physiography for young children. The writer rebels against "the senseless repetition of lists of names and meaningless definitions," and wishes "to foster the cultivation of intelligent teaching by the natural process of observation." Every lover of true education will agree with him. To this end the author has put together the materials for some fifty-eight lessons. These are classified thus:—Preliminary Lessons on a few Common Things. Lessons on Simple Natural Phenomena. Simple Observation on the Surface of the Land. Lessons on the Cardinal Points. Lessons on the Meaning and Use of a Map. Land and Water—I. The Sailors on the Sea. Land and Water—II. Simple Lessons on the Map of England. Simple Lessons on the Shape of the Earth. The Earth and its Motions. The School Globe. The book will be found of great service to young teachers especially, inasmuch as it abounds in suggestions, and in those thousand and one helps and hints as regards material and apparatus which can only be gathered together after long years of experience.

If any fault is to be found with the book, it is that we think the writer has permitted the pendulum to swing too much away from geography. There is rather an excess of elementary science in its pages. It is evidently intended for the lower classes, such as Standards I., II., and III.; but in some instances the writer, in his enthusiasm, has been drawn into the regions of speculation, introducing matter far beyond the capacity of such young people. For instance, on p. 307, the question is propounded, "What would you think if you were told that this earth of ours was once part of the blazing burning sun?" Then the child is told that "it is quite true. A tiny fragment of that immense ball of fire was once thrown off blazing and burning like the rest. That tiny fragment is the great earth on which we live. It has been cooling ever since, but it is only the outside of this ball which is cool even now. The inside of it is still a raging furnace of fire like the sun from which it came." While most scientific men give their assent to this theory, we think the subject out of place in a book which leads off by teaching pupils that water flows and is a liquid.

The writer is drawn occasionally into inexactness through his laudable desire to impress. We let pass the statement on p. 5 that "they [liquids] flow simply because they are always trying to get lower and lower down" as an effort to keep clear of the difficult question of the action of the force of gravity; but the two preceding statements that water flows "always down, never up," and "all liquids flow down, they cannot flow up," are examples of the danger of generalising. What about a siphon, capillary attraction, the common pump? Again, on p. 10, we are told that "heavy things sink in water." Heavy is, of course, a relative term. What about a block of oak or beech, or a man-of-war? On p. 306 it is said, "The sun is really fixed, and does not move at all"—a statement that needs qualifying.

These, however, are the faults of a book that is bound to be of good service, and to put right many wrong things that exist in the teaching of geography.

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students preparing for the International Diploma of Agriculture, but it is capable of considerable service to rural teachers and others who study geology as an introduction, say, to local geography. Mr. Marr discusses his subject under four sections, and elementary students will do well to postpone to the end the study of Section I., since this deals with the more technical and less interesting part of the subject—mineralogy and rock-structure. Section II., dealing with such important practical subjects as weathering, soil-formation, transport, etc., is very well written and fully illustrated; while the succeeding section, dealing with survey work and geological maps, is quite a feature of this book. A fourth section gives a rapid survey of the British formations; and this is necessarily scanty, because all that an agricultural student wants in this connection is an intelligent grasp of his own local geology, as given in the maps of the Geological Survey.

In the coloured geological map which faces the title-page, the andesites of Ballachulish and the diorites of Loch Lydoch should be coloured crimson, as basalt, etc., while the granites on Galway Bay are shown in excess.

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Philip's Brushwork Concrete Arithmetic. Books 1, 2, 3, 4. By A. F. Lydon. Whether these books will really be of service in teaching arithmetic we will not presume to say, but it is clear that they will not teach much in the way of brushwork. In many cases the effort needed to produce a successful brush drawing of the "concrete objects" given will be far greater than the mental effort needed to grasp the arithmetical problem involved. It may be possible to correlate brushwork and arithmetic, but we do not think Mr. Lydon has suggested a practical method of doing it.

In Nature's Storyland. By Edith Hirons. Illustrated by E. K. Reader. The idea of this book is excellent. The story is one of the literary forms best suited to the infant school, and the Fairy Story or Nature Myth is the best of these. But to write or to tell a story which will give all the pleasure and all the culture of taste to be aimed at is by no means an easy literary feat. Few writers, indeed, are at all equal to the task, and of those who attempt it not many seem to realise how difficult it is. The present volume is a case in point. Many of the tales are wanting in invention, and nearly all are wanting in style. The forcible-feeble "such" and "so" appear too often, and the structure and punctuation of the sentences leave much to be desired. True, we read in the preface, "Another important point is that stories should be *told*, not *read*, to young children. The teacher should read her story beforehand, make it her own, and then tell it to the children in language adapted to their age," —but more care in the language used by the writer would have much enhanced the value of the tales. The illustrations are often very good, though we are not quite sure that "the veriest tyro in drawing can reproduce them." Something simpler would have been more useful for such.

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Preliminary Tests in Geometry. Parts I. and II.: Junior Tests in Geometry. By William Slade. These little books are intended for elementary students preparing for the Cambridge Local Examinations. They consist of a number of test questions, some of which are ordinary Euclid's propositions and definitions, whilst others are practical problems in geometry. The former suggest to some extent the old system of cramming Euclid for examinations, without much thought, but the numerical exercises and problems will be found to be very useful. Hints to solutions are given at the end of the book.

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